

A Practical Guide to

Joint & Soft Tissue Injection & Aspiration

Second Edition



James W. McNabb

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Techniques



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A Practical Guide to
Joint & Soft Tissue
Injection & Aspiration

Second Edition

A Practical Guide to **Joint & Soft Tissue** **Injection & Aspiration**

**AN ILLUSTRATED TEXT FOR PRIMARY
CARE PROVIDERS**

Second Edition

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Wolters Kluwer | Lippincott Williams & Wilkins
Health

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Philadelphia, PA 19106 USA
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Printed in China

Library of Congress Cataloging-in-Publication Data

McNabb, James W.

A practical guide to joint & soft tissue injection & aspiration : an illustrated text for primary care providers / James W. McNabb.—2nd ed.

p. ; cm.

Includes bibliographical references.

ISBN 978-0-7817-9606-4

1. Joints—Diseases. 2. Musculoskeletal system—Diseases. 3. Injections, Intra-articular. 4. Needle biopsy. 5. Aspiration and aspirators. I. Title. II. Title: Practical guide to joint and soft tissue injection and aspiration.

[DNLM: 1. Injections, Intra-Articular—methods. 2. Biopsy, Needle. 3. Joint Diseases—drug therapy. WB 354 M4785pa 2009]

RC932.M29 2005

616.7'2—dc22

2009028728

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This textbook is dedicated to my family.

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Video Clips



Video clips of the following procedures can be found on the book's website.

SKIN AND SKIN STRUCTURES

Chalazion
Keloid Scar
Common Wart

HEAD AND NECK

Temporomandibular Joint
Greater Occipital Neuralgia
Cervical Strain and Sprain

UPPER EXTREMITIES

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Fibularis Brevis Tendonitis
Plantar Fasciitis
First Metatarsophalangeal Joint
Morton Interdigital Neuroma

Foreword

Orthopaedic complaints are one of the most common problems faced in the primary care office. As the population ages, degenerative and inflammatory conditions increase. With the push to stay fit and exercise, these and overuse syndromes will be compounded.

Often times the primary care physician has a knee-jerk reaction to prescribe nonsteroidal anti-inflammatory drugs (NSAIDs) for every musculoskeletal condition that presents. In the short term, this may be acceptable. However, there is serious toxicity to systemic NSAIDs. Gastric erosions, acute renal insufficiency, and hypertension are but a few. It is estimated that over 110,000 hospitalizations, as well as 16,500 deaths, occur every year because of complications of the nonsteroidal drugs.^{1,2} Contrast this with the very low complication rate of joint and soft tissue injections and it becomes very clear that corticosteroid injections may be the treatment of choice for many conditions.³ Considering the low cost, efficacy, and ease of administration, it is a wonder why they are not used more often.

One of the objections to performing joint and soft tissue aspiration and injection is lack of training. This second edition of *A Practical Guide to Joint & Soft Tissue Injection & Aspiration* by McNabb provides step-by-step, evidence-based instruction on how to carry out virtually every condition amenable to injection therapy that can be performed in a primary care physician's office. This second edition has an expanded number of chapters (from 31 to 49). The matter-of-fact, straightforward discussion condenses years of experience into the written word. Although the first edition set the standard with full-color photographs, the second edition goes even further with stunning, high-definition videos filmed from the perspective of the provider and are available online for those who purchase this comprehensive, all-inclusive text.

A Practical Guide to Joint & Soft Tissue Injection & Aspiration, 2nd edition, provides a step-by-step, well-illustrated, bullet-type presentation to injection therapy for a diverse group of musculoskeletal disorders as well as for the treatment of chalazions, keloids, warts (using candida antigen), occipital neuralgia, and more. In addition, it reviews corticosteroids, viscosupplementation, and botulotim toxin (Botox).

Coding and billing (ICD-9 and ICD-10 codes), consent forms, and patient education materials are all included.

It makes sense for primary care physicians to provide joint and soft tissue aspiration. This not only allows early diagnosis (e.g., gout, septic arthritis) but also helps with optimal treatment and pain relief, as well as saves healthcare dollars and increases patient satisfaction with healthcare delivery. There is truly no reason why all primary care physicians should not be comfortable providing injection therapy for their patients, even when they are not entirely familiar with the anatomy involved. This text contains all the information needed for the novice to begin, as well as the latest updates for the experienced clinician.

I personally have given presentations to thousands over the past 30 years on the methods for joint injection and aspiration. I truly wish this text was available for all those early programs! Following the guidelines presented in this text, injection therapy is made understandable and straightforward.

In conclusion, I congratulate Dr. McNabb on compiling an excellent, comprehensive, practical, and useful text. His thoroughness leaves few questions for the reader and sets the standard for texts on musculoskeletal aspiration and injection.

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2. Silverstein FE, Faich G, Goldstein JL, et al. Gastrointestinal toxicity with celecoxib vs nonsteroidal anti-inflammatory drugs for osteoarthritis and rheumatoid arthritis: The CLASS study: A randomized controlled trial. *JAMA.* 2000;284(10):1247–1255.
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There are precious few more rewarding moments in patient care, when one can provide almost immediate relief of pain and dysfunction when administering a diagnostic/therapeutic aspiration and/or injection. The second edition of this textbook provides a clear guide to those practitioners who wish to provide these types of procedures to their patients. There has been an increased awareness and demand for more information on these therapeutic modalities since its initial publication.

The primary audiences for this work are primary care physicians, physician assistants, nurse practitioners, residents in training and other qualified medical providers. Unfortunately, many of us have been taught to refer patients to orthopedic subspecialists if simple therapeutic measures such as the administration of NSAIDs do not produce the desired outcome. Additionally, musculoskeletal education is commonly deficient in many training programs. As a result, many primary medical providers have never learned how to offer these simple yet effective therapeutic techniques to treat a variety of common musculoskeletal and skin conditions seen routinely in primary care.

It is important that medical providers learn the techniques illustrated in this textbook to bring additional therapeutic options to their patient's medical care. This enhances the diagnostic acumen and therapeutic confidence of the clinician. Performing the injections painlessly with therapeutic effect builds positive physician-patient relationships. By keeping patients within the primary care physician's practice, this also promotes the medical home model. When effectively treating the medical condition without referral, patients experience an effective and efficient medical encounter at minimal cost and with no added inconvenience. A tangible benefit to the primary care practitioner is that procedural reimbursement provides a welcome source of income in these difficult economic times.

It has been a pleasure as well as a positive learning experience writing both editions of this textbook. Like the first edition, this text is an evidence-based guide that explains both the theory and the actual performance of joint and soft tissue injections and aspirations. This second edition was much more difficult to write than I anticipated. The challenge was to build on the success of the first edition by increasing the content and number of injections, while keeping the book truly practical. New features have been added including a section on injections of skin conditions that are not typically found in texts of this type. The section on Foundation Concepts was expanded to include synovial analysis, a new topical refrigerant spray—PainEase, additional viscosupplements, information on the use of botulinum toxin and musculoskeletal ultrasound. Significant additions of critical chapters describe head/neck injections and less common conditions in other body areas. Coding resources have been expanded to include the anticipated ICD-10 nomenclature. In the Appendix, an example of medical record documentation has been added. The most exciting component of this edition has been the inclusion of high definition videos of almost every procedure. These are case-based films that were recorded in my office on actual patients. The videos are available on the accompanying web site.

I would like to acknowledge the following people and organizations who taught, encouraged, and helped me write this textbook. This project is a culmination of 25 years of private practice and teaching. First, I must again thank my wife, Liz, for her support during the writing of this book, my medical education, and years of practice and teaching. Without you I could never have done this. Thanks go to my three children, Ian, Bryce and Caitlin, for their understanding. The leadership and faculty of training programs at the University of Wyoming—Casper, Scottsdale HealthCare, and Cabarrus Family Practice Residency Programs were instrumental in allowing me to expand my knowledge base, develop sports medicine curricula, and build expertise in evidence-based medicine. My office staff has been great—putting up with my demands and politely getting out of my way when I would rush down the hall with the video camera equipment. Without the confidence of my patients, I would not have been able to achieve mastery of these techniques—for that I remain privileged to serve as your family physician. I must acknowledge the opportunity to teach the Joint Injections workshops for both the North Carolina and American Academies of Family Physicians over the last ten years. Many thanks are directed to workshop participants for their participation and honest feedback. Special recognition is extended to family physician, Roy “Chip” Watkins, MD. He serves as my presentation partner as we teach the workshops. It is always enjoyable to engage him in conversations about teaching these procedures. Finally, a big thank-you to those at Wolters Kluwer Health, in particular, Kerry Barrett—the senior managing editor, Sonya Seigafuse—the acquisitions editor, and Chris Merillo who has processed the videos. They have treated me with the utmost professionalism, support, and patience during the long process of writing this second edition. To all involved and so many more unintentionally left unnamed—Thank you!

Introduction

The performance of joint and soft tissue injections and aspirations is a valuable skill that can be mastered by primary care physicians and qualified medical providers. These procedures can help relieve pain and improve function for the patient, at the same time empowering the clinician. It is essential that these techniques be used thoughtfully and precisely in conjunction with making the correct diagnosis of musculoskeletal disorders. This can be quite challenging at times but is no more difficult than diagnosing and treating any of the other medical conditions that the primary care physician encounters on a daily basis. Learning how to confidently make an accurate diagnosis of musculoskeletal conditions is beyond the scope of this text. Several good references are listed in the appendix.

Our primary consideration is the welfare of the patient. We must always endeavor to provide the best medical care at the least risk. This can be achieved by developing a cognitive knowledge base along with an accompanying set of complementary procedural skills. In addition, our focus must remain on providing a positive patient experience. This involves the provision of a safe and supportive environment while ensuring a pain-free procedural experience. Patient satisfaction from a positive experience along with a good clinical outcome is the primary goal.

An important concept is that aspiration and injection therapy is not an end in itself. It is only one treatment option. The withdrawal of fluid or the precise deposition of corticosteroid is a temporary measure that is generally used as an adjunctive therapy to other modalities. In many conditions, corticosteroid injection therapy has been demonstrated to give short- to intermediate-term pain/functional relief, but no difference in long-term results. In these cases, the initial treatment using corticosteroids and subsequent treatment of another modality gives optimal long-lasting results. Additional therapeutic options may include relative rest, compression, splinting/casting, ice, heat, ultrasound, stretching, physical therapy, and administration of other medications for pain control or even surgery. The performance of aspirations or injections alone, without correcting the underlying factors, is likely to result in recurrence if used without complimentary treatment.

In this text, the following primary learning objectives are identified:

- Describe the indications and contraindications for each procedure.
- Review the current medical literature.
- Select appropriate equipment/products for each injection or aspiration.
- Illustrate pertinent anatomic landmarks for each procedure.
- Demonstrate safe and effective technique.

Foundation Concepts

UNDERSTAND THE ANATOMY

It is critical that the clinician has a complete understanding of the three-dimensional anatomy in each area that is selected for injection or aspiration. A thorough knowledge of the target area structures brings a deeper understanding of the pathologic process causing the patient's symptoms. It also enables the provider to develop a list of alternative diagnostic possibilities. With this knowledge, the physician is able to take the next step. He or she should now be able to understand structural relationships beneath the surface of the skin. The physician is then able to think in three dimensions. While advancing the needle, it is important to "visualize" the location of the needle tip as it passes through the anatomic structures. Performing these thought processes enables the precise location of the needle. This results in improved clinical outcomes through the accurate placement of a therapeutic product or the insertion of a large-bore needle for fluid aspiration. Complications from needle trauma are minimized by avoidance of critical structures.

IDENTIFY THE LANDMARKS

For each injection or aspiration procedure, the physician must identify the pertinent local anatomic landmarks. These are areas that represent underlying bony prominences or easily identifiable soft tissues. The landmarks are specific to each injection site. After identification, the structures should be marked on overlying skin with ink by using either a ballpoint pen or a surgical marking pen. Next, the entry site for the needle is marked with ink and an indentation in the skin is created by applying firm pressure to the skin with the retracted tip of a ballpoint pen. This gives the clinician a visual frame of reference and standardizes the procedure from one patient to the next. No matter how much experience a physician has with a procedure, the process of marking the landmarks and entry site in ink should not be skipped. After committing the landmarks to a surface drawing, the patient is instructed not to move that area of the body. Movement will change the relationships between the skin ink marks and the underlying anatomy.

THOUGHTFUL CONSIDERATION

As with any medical procedure, performing injections and aspirations places a great responsibility on the operator. These procedures should be done with a clear differential diagnosis and treatment plan in mind. They should never be performed indiscriminately. The medical provider must consider the indications, contraindications, weight of evidence in the medical literature, expected benefits, possible side effects, anticipated outcomes, diagnostic certainty, his or her personal experience with the procedure, clinical experience, the patient's response to previous injections, and respect for the patient's values before making a decision on whether or not to perform any intervention. This is

a very complex process that requires thoughtful contemplation. It is imperative that the clinician uses common sense and know his or her limits before performing any medical procedure. In some cases, following a conversation with the patient, it may be preferable to use an alternative approach or request specialty consultation, rather than performing any invasive procedure.

WHEN TO REFER TO A SUBSPECIALIST

There will be situations where referral to subspecialist colleagues is desirable and necessary. This would be the case whenever the provider feels uncomfortable performing a procedure. Other indications include instances where there is confusion regarding the correct diagnosis, the expected response to treatment has not occurred, joints are not easily accessible (hip or sacroiliac joints), arthrocentesis attempts have been unsuccessful; or septic arthritis, suspected inflammatory polyarthritis, recurrent monoarthritis unresponsive to treatment, or undiagnosed chronic monoarthritis. In these instances, the patient may be referred to an orthopedic surgeon, rheumatologist, interventional radiologist, or pain specialist. If an acute septic joint is suspected, the patient requires immediate inpatient hospitalization for joint drainage, debridement, intravenous antibiotics, and possibly an infectious disease consultation in the case of an atypical infection.

INDICATIONS FOR INJECTIONS AND ASPIRATIONS

There are many indications to perform injections and aspirations. From a diagnostic standpoint, the introduction of local anesthetic solution into a joint may allow a more comprehensive exam than is possible before relief of pain. Pain limits the musculoskeletal exam through voluntary or involuntary guarding of the affected area. Muscle spasm commonly develops in response, further limiting the range of motion of the area examined. Providing effective pain relief allows the clinician to adequately examine the area of interest. This is essential in order to determine the integrity of underlying structures including tendons, ligaments, and cartilage.

For example, a patient presents with acute traumatic shoulder pain. Upon examination, she complains of moderately severe pain, holds the shoulder at her side, and is unable to demonstrate shoulder abduction because of pain. After injection of 10 mL of 1% lidocaine, the patient is able to demonstrate full range of motion including unrestricted abduction. This indicates that there is not a complete tear of the rotator cuff structures. She may be able to continue to receive care directed by the primary medical provider without specialty referral at that time.

Fluid may also be obtained upon aspiration. If so, then it should be grossly examined for color, clarity, and the presence of blood. Normal fluid is clear and transparent. The fluid may contain blood that indicates a hemorrhagic cause—most commonly acute trauma. It may also be yellow due to xanthochromia from the breakdown of hemoglobin leaking from inflamed synovium. The clarity of the fluid may be altered by the presence of WBCs. Less commonly, crystals and cellular debris can decrease it. Information obtained from the microscopic examination of the fluid in order to assess it for cells, crystals, bacteria, and blood may be critically important and is discussed in a following chapter.

Therapeutically, there are many reasons to perform injections and aspirations. Removal of fluid from a joint alone can result in significant pain relief and restore joint range of motion. With relatively small joints such as the elbow, this can occur with the removal of 5 or 10 mL whereas with the knee, it is not uncommon to remove upward of 100 or even 150 mL in chronic conditions!

Indications for therapeutic injections include crystalloid arthropathies, synovitis, rheumatoid arthritis, other inflammatory arthritis, osteoarthritis, and osteoarthritis. Soft tissue indications include bursitis, tendonitis, tendinosis, epicondylitis, trigger points, ganglion cysts, neuromas, nerve entrapment syndromes, and fasciitis. With inflammatory joint and soft tissue conditions, therapeutic effect is achieved by the precise placement of a corticosteroid/local anesthetic mixture.

Injections of corticosteroids may also be given directly into lesions in patients with skin diseases as diverse as hypertrophic scars, keloids, lichen planus, lichen simplex chronicus, psoriasis, alopecia areata, and discoid lupus.

CONTRAINDICATIONS TO INJECTIONS AND ASPIRATIONS

While knowing the indications of aspirations and injections is important, it is perhaps even more valuable to recognize the situations where these procedures are contraindicated. Absolute contraindications include performance of a procedure on an uncooperative patient, lack of informed consent, history of true allergy to the proposed injected medication, previous documented severe steroid flare, injection through infected tissues, and injection of corticosteroid into critical weight-bearing tendons. In particular, the injection of steroid into and around the Achilles and patellar tendons may result in catastrophic rupture of these structures. Recovery from such rupture is often difficult, prolonged, and incomplete.

Many relative contraindications exist. These are variable and may apply only to certain patients or situations. Some of these include injections near critical structures such as arteries, veins, nerves, or pleural surfaces. Also, caution must be exercised in patients with coagulation disorders, allergy to the preservative in the injected solution, immunocompromised states, brittle diabetes, history of avascular necrosis, previous joint replacement at the injection site, and excessive anxiety concerning the procedure, and in patients with whom postprocedure instructions may not be followed.

In patients receiving corticosteroids, there may be the activation of latent disease or an exacerbation of intercurrent infections due to pathogens, including those caused by ameba, *Borrelia burgdorferi* (Lyme disease), *Candida*, *Cryptococcus*, *Mycobacterium*, *Nocardia*, *Pneumocystis*, *Strongyloides* (threadworm), and *Toxoplasma*. Latent or active amebiasis should be ruled out before initiating corticosteroid therapy in patients who have spent time in the tropics or present with unexplained diarrhea.

Patients taking warfarin, an oral anticoagulant medication, do not represent an absolute contraindication to injection or aspiration. Thumboo et al. in 1998 in the journal *Arthritis and Rheumatism* reported the results of a prospective cohort study of 32 joint and soft tissue injections and aspirations involving patients attending a rheumatology clinic taking warfarin with an INR <4.5. Patients followed up for 4 weeks after the procedure showed no significant hemorrhages.

SAFETY

In order to ensure patient and operator safety, the following procedures should be followed. First, define the local anatomic landmarks. This assures the provider that the needle is being advanced with a knowledge of the underlying structures. Next, always use universal precautions to avoid inadvertent contact with sharp objects and blood or all body fluids. In order to decrease the chance of needle stick injury, there are a variety of new safe-sharp needle systems available for use. It is the practitioner's responsibility to utilize one of these designs to avoid injury and maintain compliance with OSHA regulations. Finally, always use medical aseptic techniques when performing invasive procedures on any patient.

Using a medical aseptic technique does not mean that the procedure needs to be done in a sterile operating room environment. However, it does require that the provider takes the necessary precautions to ensure that there is no chance that infectious organisms are carried into the tissues by the needle. When performing injections and aspirations, the operator must always follow the “no-touch” technique.

The medically aseptic no-touch technique does not allow for any contact of the injection site after sterile preparation of the skin. After the local landmarks are identified, the injection site is marked with ink. Then, an impression in the skin is made at that site by applying firm pressure with the retracted tip of a ballpoint pen. Next, the injection site is cleansed with alcohol, followed with povidone-iodine. The povidone-iodine solution is allowed to dry. After these steps are completed, there is no further contact or touching of the site with any nonsterile objects. The only object that comes into contact with this site is the sterile needle. After the procedure has been completed, clean gauze is used to wipe the site and a sterile adhesive dressing is applied. If this technique is strictly followed, then it is unnecessary to use expensive sterile gloves, drapes, gowns, or masks while performing these procedures.

Always attempt to aspirate before injecting any substance. This will confirm that the needle tip is not inside a blood vessel. Performing this simple maneuver ensures that inadvertent intravascular injection of the injection solution does not occur.

Place the injection *within* a joint or bursa and *around* a tendon. An injection into the substance of a tendon is likely to weaken that structure. Rupture may follow—especially if it is a weight-bearing tendon such as the Achilles or patellar tendons. Also avoid injecting directly into nerves. Such an injection will be evident since the patient should report pain, paresthesias, or numbness at the time of needle contact with a nerve. In this case, simply withdraw the needle slightly and attempt to reposition the needle before injecting the corticosteroid solution.

After injection, the patient should remain in the office for at least 20 min. During this time, the office staff observes the patient for any signs of systemic or local reactions.

SYNOVIAL FLUID ANALYSIS

The acquisition of a sample of synovial fluid for microscopic analysis is the primary objective of arthrocentesis. Examination of the fluid can provide information critical to the diagnosis of the condition that has caused the joint effusion. This is especially important in the case of acute monoarthritis in which either septic or crystal arthritis may be present. After arthrocentesis has been successfully performed, the appearance of the fluid is observed. Normal fluid is clear and transparent. Fluid that is translucent, cloudy, or bloody should be noted. Next, the fluid is either immediately examined under a microscope or transferred as quickly as possible to a laboratory capable of providing further testing. If the specimen is sent for synovial fluid analysis, then it is placed in a glass tube anticoagulated with liquid ethylenediaminetetraacetate (EDTA). Do not use tubes that contain heparin, oxalate, or lithium since these anticoagulants confound crystal analysis. Fluid submitted for culture is transferred from the syringe to appropriate culture media. A general bacterial culture medium is appropriate for most cases of septic arthritis. However, gonorrhea is a common cause of septic monoarthritis. If this is suspected, then transport it in Thayer–Martin medium under CO₂. Cultures from other sites including the pharynx, cervix, urethra, and rectum are necessary if gonococcal disease is suspected. Plate the specimen in Sabouraud dextrose agar if a fungal infection is a consideration.

In the past, a number of tests for glucose, pH, and lactic acid were routinely recommended, but evidence-based investigation has disproved their value. Traditionally,

TABLE 1**Synovial Fluid Properties**

	Appearance	Viscosity	Cells/mm³	% PMNs	Crystals
Normal	Transparent	High	<180	<10%	None
Osteoarthritis	Transparent	High	200–2,000	<10%	None
Rheumatoid arthritis	Translucent	Low	2,000–50,000	Variable	None
Psoriatic arthritis	Translucent	Low	2,000–50,000	Variable	None
Reactive arthritis	Translucent	Low	2,000–50,000	Variable	None
Gout	Translucent to cloudy	Low	2,000–50,000	>90%	Needle-like + birefringence
Pseudogout	Translucent to cloudy	Low	2,000–50,000	>90%	Rhomboid-like – birefringence
Septic arthritis	Cloudy	Variable	2,000–50,000+	>90%	None
Hemarthrosis	Red	Low	2,000–50,000	<10%	None

joint effusions have been classified as normal, noninflammatory, inflammatory, and hemorrhagic. The absolute cell count is the major discriminating factor between an inflammatory fluid and a noninflammatory fluid. Fluids with cell counts less than 2,000 cells/mm³ are likely to be noninflammatory and inflammatory fluids generally have more than 2,000 cells/mm³. The differential leukocyte count may add further information. A noninflammatory fluid generally contains less than 50% polymorphonuclear cells (PMNs) and an inflammatory fluid considerably more. Recent studies show that the only useful synovial tests in the setting of septic arthritis are the WBC count, percentage of PMNs, Gram stain, and culture.

Crystal analysis can be performed in any office equipped with a microscope. A single drop of fluid is placed on a clean slide and is examined under a cover slip. Crystals can be observed with plain microscopy and a preliminary identification made with regard to crystals, WBCs, and bacteria. A polarizing light microscope provides the gold standard for crystal identification. This is usually present only in a referral laboratory. Monosodium urate crystals found in gout appear needle shaped and are strongly negatively birefringent when examined under polarization. Calcium pyrophosphate dihydrate crystals are found in pseudogout. These are strongly refractile, short, shaped as rhomboid rods, and weakly positively birefringent. Crystals found in cells are more of a specific finding for gout or pseudogout (Table 1).

SPECIAL MEDICAL CONDITIONS

Several medical conditions deserve special consideration. Diabetes is an increasingly common medical condition affecting the primary care physician's patient population. Because of the frequent association with obesity, these patients often place mechanical and metabolic stress on joint and soft tissues that can be amenable to treatment using injectable corticosteroids. However, the administration of steroids is known to elevate blood sugars above their usual levels. Recent studies have shown that corticosteroid injections are safe in patients with diabetes. The rise in blood sugars is minimal and well controlled with carbohydrate restriction, continuation of the usual diabetes treatment regimen, and close monitoring of blood sugars for 5 days following injection. However, the presence of diabetes may make treatment using injected corticosteroids less effective.

Concern has been raised regarding the performance of injections in patients taking oral anticoagulants including aspirin, NSAIDs, other antiplatelet agents, and warfarin. A prospective cohort study by Thumboo published in the *British Medical Journal* in 1998 demonstrated safe and effective joint and soft tissue injections and aspirations of 32 procedures on patients with therapeutic doses of warfarin. No episodes of hemarthrosis or abnormal bleeding were observed. This has also been the author's experience in many more patients (unpublished data).

Septic arthritis is a medical emergency. A joint infection is a very serious condition with dire consequences to the integrity of the joint and surrounding structures. All efforts must be made to diagnose septic arthritis immediately and provide emergent hospitalization. The patient requires treatment including surgical drainage/irrigation of the affected joint, administration of intravenous antibiotics, and pain control. This requires the coordinated care of the primary care physician, orthopedic surgeon, and possibly an infectious disease subspecialist. Common organisms causing joint infections are *Neisseria gonorrhoeae*, *Streptococcus/Staphylococcus* species and, increasingly, methicillin-resistant *Staphylococcus aureus*.

Rheumatoid arthritis presents unique challenges to the primary care provider. This is a destructive, rapidly progressive inflammatory arthritis. Lytic enzymes rapidly degrade the joint surfaces, synovium, and supporting structures unless the process is interrupted and controlled. Joint and soft tissue injections play an important role in medical care because they can be used to deliver relatively small doses of corticosteroids locally to augment the overall systemic management of this condition.

Management of pain involving joint replacements demands special consideration. Pain involving a joint replacement often occurs because the normal biomechanics of a joint are altered. Another cause of pain can be poorly fitting or loose components of prostheses. Simple injections of corticosteroids or other substances often do not lead to meaningful improvement in the patient's pain and certainly do not correct any underlying biomechanical abnormality. In these patients, it is often more prudent to not perform injections and to refer the patients back to their orthopedic surgeon for management of this challenging problem.

TOPICAL ANESTHESIA

Providing the patient with a pain-free experience is the responsibility of the primary care provider. In select injections, such as the posterior approach to the subacromial space, techniques such as stretching/pinching the skin and other dermal stimulation may give adequate distraction to the patient so that the pain from needle insertion is not felt.

Local anesthesia to needle introduction can be achieved by use of either topical or injectable local anesthetic agents. A topical vapocoolant spray can be used to give rapid onset of brief, but effective, skin numbness. These skin refrigerants cause a brief period of noncytotoxic freezing of the epidermis. This provides several seconds of local anesthetic effect, which blocks the pain associated with needle injections. The mechanism of action for anesthesia is to decrease nerve conduction velocity of the C fibers and A-delta fibers of the peripheral nerve system. This interrupts nociceptive input to the spinal cord.

To administer ethyl chloride, the bottle is held upside down approximately 18 in. from the treatment area. The stream is directed continuously on the injection site. After 10 to 20 s, freezing occurs, which is indicated by frosting of the skin. The needle is then immediately inserted into the skin. Care must be exercised when using ethyl chloride as this product is flammable. It should never be used in the setting of open flames or sparks—including hyfrecators, radiofrequency devices, or lasers.

Alternatively, the Gebauer Corporation manufactures PainEase (a proprietary mixture of 1,1,1,3,3-pentafluoropropane and 1,1,1,2-tetrafluoroethane). PainEase is available as an aerosolized mist spray and as a medium stream. Both are distributed in pressured cans and are nonflammable products. They may be used on intact skin, minor skin wounds, and intact mucous membranes. Gebauer's PainEase mist is administered by holding the can upright approximately 4 in. from the application site and spraying for 5 s on average. The fine droplets of mist are dispersed in a circular pattern about 2 in. in diameter. The medium stream spray produces a pinpoint stream that contacts the skin surface at a specific location. Both products are sprayed until the skin just turns white. Adequate local anesthesia for needle injection or minor surgical procedures lasts several seconds. PainEase is not carcinogenic or teratogenic and, thus, may be used safely in pregnancy when used as directed. Furthermore, this product offers advantages over ethyl chloride, including a larger field of anesthesia, lack of "running" of liquid down the skin, and nonflammability. With prolonged contact, both ethyl chloride and PainEase may damage polyvinylchloride coverings used to upholster examination tables. Barrier pads used during injections effectively keep the vapocoolant fluid from contact with the upholstery.

LOCAL INFILTRATION ANESTHESIA

The injection of local anesthetic into joints or soft tissues serves several purposes. Administration of the local anesthetic provides short-term pain relief. This allows for patient feedback. It may provide a more comprehensive examination of the affected area without the limitation of pain. In general, a local anesthetic is mixed in the same syringe as the corticosteroid solution. The added volume of the local anesthetic helps dilute the corticosteroid. This enables dispersion of steroid in a large joint space or bursa. Although mixing with local anesthetics is not recommended by the manufacturers of injectable corticosteroids, it is uniform practice with physicians administering injections. Pain relief following injection confirms the proper placement of corticosteroid both to the clinician and to the patient. Although pain may return after the anesthetic wears off, the patient can be assured that the injected corticosteroid should begin to exert its clinical effect after 24 to 48 h.

There are a few local anesthetic choices. Most commonly, lidocaine is used. Lidocaine for local anesthetic injection is commercially available as 0.5%, 1%, and 2% concentrations. It is available with or without epinephrine. For joint and soft tissue injections the author exclusively uses 1% lidocaine without epinephrine. This is commonly available in 50 mL multiuse bottles containing methylparaben, a preservative. Lidocaine is also available as 2 mL single-use preservative-free vials. The 2% solution of lidocaine confers no clinically important advantages and increases the risk of toxicity following administration of large amounts. The inclusion of epinephrine likewise offers no clinical advantages and is not used in these procedures to dilute the corticosteroid. In fact, lidocaine with epinephrine is acidic and causes significant transient local burning pain upon injection. The only time that the author uses 1% lidocaine with epinephrine during these procedures is when providing local anesthesia prior to performing a knee aspiration and/or injection.

Bupivacaine (Marcaine, Sensorcaine) is another commonly used local anesthetic. It has a longer onset of action but offers extended anesthetic effect. It affords 6 to 8 h of local anesthesia. Multiuse vials also contain 1 mg of methylparaben as a preservative. Many physicians prefer to mix lidocaine with 0.25% bupivacaine in order to give the patient rapid onset of local anesthesia with an extended duration. However, there is no proven clinical benefit using this approach. Because of the additional steps

required to draw up the separate anesthetics, preparation of this combination may increase the chance of contamination and needle stick injury. It may also give the patient a false sense of security since there is prolonged initial pain relief before the tissues have healed. Since the negative feedback from pain is absent for an extended period of time, the patient might suffer further injury such as tendon rupture through inadvertent use of the affected body area.

The pH of local anesthetics can be buffered to decrease local pain. The pH of 1% lidocaine without epinephrine is 6.5 while the pH of 1% lidocaine with epinephrine is 4.5. Bupivacaine is isotonic. Adding sterile sodium bicarbonate to lidocaine with epinephrine at a ratio of 1:10 neutralizes the mixture and has been shown to provide significant pain relief. However, this is not a clinically important issue with joint injections because plain lidocaine is used and not lidocaine with epinephrine.

INJECTABLES

Corticosteroids

Corticosteroids used for injection purposes are synthetic derivatives of hydrocortisone. Because these compounds reduce pain and swelling, they are commonly injected into inflamed joints and soft tissues for therapeutic effect. The exact mechanism of action of corticosteroids is complex with various sites of action. They bind to glucocorticoid receptors regulating gene transcription. There is a vascular stabilizing effect by inhibition of endothelial expression of adhesion molecules for neutrophils. Capillary dilation and vascular permeability are reduced. By altering the effect of protein synthesis, corticosteroids also reduce cytokines and other inflammatory mediators. There is also a decline in the number of macrophages and PMNs that migrate into the area. The end effect is to reduce the amount of inflammation, thereby reducing swelling and pain.

Several different corticosteroids are commercially available to use for joint and soft tissue injections (Table 2). These include triamcinolone acetonide (Kenalog), triamcinolone diacetate (Aristocort), triamcinolone hexacetonide (Aristospan), methylprednisolone acetate (Depo-Medrol), betamethasone acetate and sodium phosphate (Celestone

TABLE 2

Properties of Injectable Corticosteroids

Corticosteroid	Relative Anti-inflammatory Potency	Solubility (%Wt/Vol)	Biological Half-life (h)
Hydrocortisone acetate (Hydrocortone)	1	High 0.002	8–12
Triamcinolone acetonide (Kenalog)	5	Intermediate 0.004	12–36
Triamcinolone hexacetonide (Aristospan)	5	Intermediate 0.0002	12–36
Methylprednisolone acetate (Depo-Medrol)	5	Intermediate 0.0014	12–36
Betamethasone acetate and sodium phosphate (Celestone Soluspan)	25	Low	26–54
Dexamethasone acetate (Decadron-LA)	25	Low	26–54

Soluspan), and dexamethasone acetate (Decadron-LA). The agents differ with regard to their potency, solubility, and biological half-life (Table 2). Potency is measured against hydrocortisone. Different products have varying effects and solubility in the tissues. The solubility is inversely proportional to the biologic duration of effect of the agent. Hydrocortisone is rarely used because of its high solubility and short duration of action. It also has significant mineralocorticoid activity that is not shared by the other agents.

Few studies have been done that directly compare the various agents in terms of their efficacy and duration of action. Furthermore, no studies have been done that conclusively determine which corticosteroid is preferred for injection of joints or soft tissues. Without good data, the selection of the particular corticosteroid agent is left to the preference of the individual clinician. Considering medication availability, cost, and past experience, the author prefers to use triamcinolone acetonide (40 mg/mL). If another corticosteroid is chosen, then the equivalent dosage and volume of administration may be calculated from the comparison table (Table 3).

The dose of corticosteroid to be used generally depends on the injection site, disease process, and degree of inflammation. Suggested doses of corticosteroid are listed in each individual chapter. Table 3 presents equivalent dosages of corticosteroids used for injection. For the purpose of this book, all doses are expressed in milligrams of triamcinolone acetonide suspension (Kenalog). If the physician chooses to use another steroid, then the comparative dosage can be calculated from the table. For instance, if the chapter in this text indicates that 20 mg of triamcinolone is to be used for injection into the wrist joint, then one could use 20 mg of Kenalog, 20 mg of Aristospan, 20 mg of Depo-Medrol, 4 mg of Decadron-LA, or 3 mg of Celestone Soluspan.

In general, corticosteroid injections should be performed no more often than every 3 months. This is done to prevent the systemic complication of hypothalamic–pituitary–adrenal axis suppression, osteoporosis, and local articular degradation.

The author typically uses two syringe sizes when injecting corticosteroids. A 3-mL syringe is used for most of the injection sites. This accommodates 1 mL of the 1% lidocaine and 1 mL of corticosteroid. A 10-mL syringe is used for large joints such as the subacromial space, and sacroiliac, hip, and knee joints. In this case, 8 mL of 1% lidocaine is mixed with 1 mL of the corticosteroid. These syringes may be prepared at the time of the procedure, or ahead of time, and be stored in a cabinet protected from heat and light for up to 2 weeks before use. When injecting a corticosteroid–local anesthetic mixture, a common observation made is that the corticosteroid often precipitates toward the bottom of the syringe. Immediately before the corticosteroid–local anesthetic mixture is injected, 1 mL of air is aspirated into the syringe creating a “mixing bubble” (Fig. 1). The syringe

TABLE 3
Equivalent Dosages of Injectable Corticosteroids

Corticosteroid Preparation	Trade Name	Equivalent Dose/Volume (mg/mL)
Triamcinolone acetonide	Kenalog	40
Triamcinolone hexacetonide	Aristospan	40
Methylprednisolone acetate	Depo-Medrol	40
Dexamethasone acetate	Decadron-LA	8
Betamethasone acetate and sodium phosphate	Celestone Soluspan	6

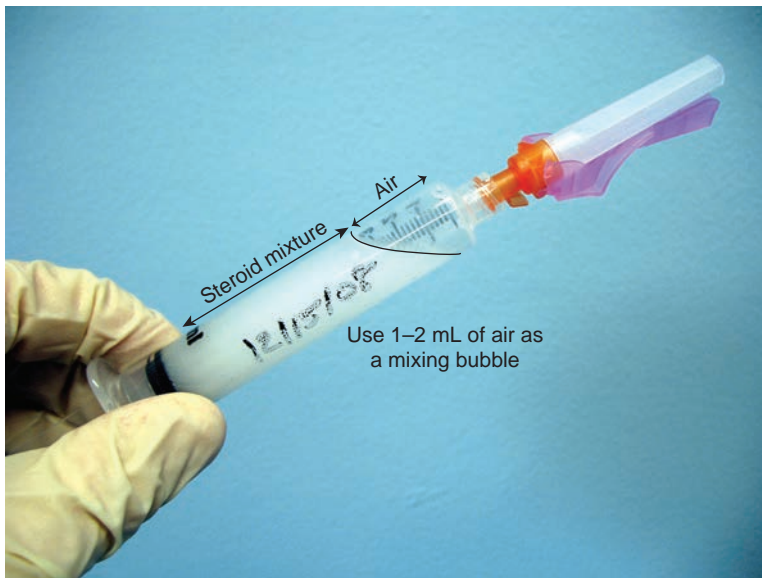


FIGURE 1 ● Mixing bubble.

is then rapidly rotated in order to disperse the corticosteroid in the local anesthetic evenly throughout the syringe. The needle of the syringe is then pointed upward and the small volume of air expelled before the needle is inserted into the skin at the target site.

There is a common misconception that distributing the corticosteroid over a wide area enhances the effect from soft tissue injections. Practitioners frequently use a “fanning” or “peppering” technique to distribute the solution across the area of involvement. This, however, is frequently unnecessary. The solution is injected as a bolus and will passively move in the tendon sheaths and local fascial planes. Consideration may be given to “fanning” when injecting back trigger points and trochanteric bursitis.

Viscosupplementation

Hyaluronan (sodium hyaluronate) is a natural complex sugar of the glycosaminoglycan family. The concentration and size of endogenous hyaluronan are reduced in the joint fluid of patients with osteoarthritis. Currently, there are several products available for injection that can be used to supplement this substance in joint fluid. These commercial agents are high molecular weight derivatives of hyaluronan, which are synthetically derived from rooster combs or produced by bacterial fermentation and extraction. The exact mechanism of action of viscosupplementation is unknown, but may involve physical cushioning of the knee joint, anti-inflammatory action, and/or the stimulation of production of endogenous hyaluronan by synoviocytes.

Injectable hyaluronan is commercially available in the United States as the products Synvisc (Genzyme), Orthovisc (Depuy Mitek), Hyalgan (Sanofi-Aventis), Supartz (Smith & Nephew), and Euflexxa (Ferring) (Table 4). They are classified not as medications, but as medical devices by the U.S. Food and Drug Administration. These agents are approved only for the treatment of pain in osteoarthritis of the knee in patients who have failed to respond adequately to conservative nonpharmacologic

TABLE 4

Viscosupplementation Products

<i>Viscosupplementation products—synthetically derived from rooster combs</i>	
Synvisc (Genzyme) www.synvisc.com	8 mg/mL—2-mL syringe given as three weekly injections
Orthovisc (Depuy Mitek) www.orthovisc.com	15 mg/mL—2-mL syringe given as three to four weekly injections
Hyalgan (Sanofi-Aventis) www.hyalgan.com	10 mg/mL—2-mL syringe given as five weekly injections
Supartz (Smith & Nephew) www.supartz.com	10 mg/mL—2.5-mL syringe given as five weekly injections
Neovisc (Stellar) www.stellarpharma.com/NeovisC1.htm . (European and Canadian approval only at this time.)	10 mg/mL—2-mL syringe given as three to five weekly injections
<i>Viscosupplementation products—produced by bacterial fermentation and extraction</i>	
Euflexxa (Ferring) www.euflexxa.com (only product in class that is FDA approved at this time)	10 mg/mL—2-mL syringe given as three weekly injections
Durolane (Q-Med) www.durolane.com . (European and Canadian approval only at this time.)	20 mg/mL—3-mL syringe given as a single injection
<i>Non-animal-stabilized hyaluronic acid (NASHA)</i>	
Ostenil (TRB Chemedica) www.ostenil.ca . (European and Canadian approval only at this time.)	10 mg/mL—2-mL syringe given as three weekly injections
Suplasyn (Bioniche) www.suplasyn.com . (European and Canadian approval only at this time.)	10 mg/mL—2-mL syringe given as three weekly injections

therapy and simple analgesics such as acetaminophen. The safety and effectiveness of the use of these viscosupplements in other joints have not been established.

Evidence-based support in the medical literature for the use of hyaluronan derivatives is incomplete. The most optimistic studies show clinical improvement up to 1 year following injection. However, there may be specific utility when treating patients who have brittle diabetes mellitus, those who have failed corticosteroid injections, patients who have received frequent corticosteroids and are in danger of the significant side effects from repeated administration, or those patients who have a rare allergy to corticosteroids or have developed steroid flare. Use of injected hyaluronan may allow appropriate postponement of total knee replacement surgery.

Although these products are similar, Synvisc, Orthovisc, and Euflexxa are given intra-articularly as a series of three weekly injections. Both Hyalgan and Supartz are administered in a series of five injections at weekly intervals. All three preparations are prepackaged in sterile syringes. They are expensive and knowledge of the reimbursement process is recommended.

The most commonly reported adverse reactions are transient local pain, swelling, effusion of the injected knee, and rash. Administration is contraindicated in patients with allergies to avian proteins, feathers, or egg products or in patients with known hypersensitivity to hyaluronan products. Since Euflexxa is produced by bacterial fermentation, the concerns about avian allergy do not apply.

Botulinum Toxin

Botulinum neurotoxin is a group of seven related proteins produced by *Clostridium botulinum*. Of these, only type A and type B neurotoxins are approved for use in the United States. Botulinum toxin irreversibly binds to the presynaptic nerve membrane and blocks formation and transmission of acetylcholine at the neuromuscular junction. The neuromuscular effect of botulinum causes a flaccid paralysis of the injected muscles. It effectively creates a “medical splinting” of the target musculotendinous unit that prevents continued use. This functional-forced rest of the area for approximately 3 months allows the pathology to heal.

Injections are performed with a Teflon-coated, 24-gauge needle connected to an electromyographic machine. Those muscles with highest clinical and EMG activity are injected. Therapeutic effect from the injection usually occurs in the first 7 days and the response lasts for an average of 12 weeks. Injections usually are repeated every 3 to 4 months. Recovery occurs through proximal axonal sprouting and muscle reinnervation by formation of a new neuromuscular junction.

Effective treatment using botulinum toxin has been demonstrated in the treatment of various musculoskeletal disorders including cervical dystonias, cervicogenic headache, temporomandibular joint disorders associated with increased muscle activity, myofascial pain disorder, piriformis syndrome, limb dystonia (writer’s cramp), and lateral epicondylitis. A list of the botulinum toxin products currently approved for use in the United States is displayed in Table 5. At this time, the use of botulinum neurotoxin for the treatment of pain is approved only by the U.S. Food and Drug Administration for cervical dystonia. Use of botulinum toxin for other pain is considered off-label use and may be considered appropriate only for patients with a condition that does not respond to, or is judged inappropriate for, more conservative treatment.

Other

Other agents that are currently investigational may earn a regular place in the practice of joint injections. These include intrasynovial NSAIDs, Sarapin (a solution of soluble salts of the volatile bases from sarraceniaceae—the pitcher plant), autologous blood, and biologic agents such as Etanercept. An exciting future treatment may involve injecting appropriate viral vectors into joints to transfer genes into synoviocytes for the treatment of rheumatoid arthritis, inflammatory arthritis, and osteoarthritis.

TABLE 5

Botulinum Neurotoxin

<i>Botulinum neurotoxin type A products</i>	
Botox (Allergan) www.allergan.com	100 units/vial
Dysport (Ipsen) www.dysport.com	500 units/vial
<i>Botulinum neurotoxin type B product</i>	
MyoBloc (Solstice Neurosciences) www.myobloc.com/hcp	5,000 units/mL

Items that should be collected (Fig. 2):

- Gloves—nonsterile exam gloves
- Ballpoint pen
- Barrier “chucks” pads—nonsterile
- Alcohol pads
- Povidone-iodine pads (not swab sticks)
- Gauze pads—nonsterile
- Adhesive bandages
- Hemostat surgical clamp (optional)
- Syringes
 - 3 mL
 - 5 mL
 - 10 mL
 - 20 mL
 - 60 mL
- Needles
 - 20 gauge—1 in.—for drawing medications and aspiration of small joints
 - 18 gauge—1-1/2 in.—for aspiration of large joints and bursa
 - 25 gauge—1/2, 1, and 1-1/2 in.—for injections
 - 25 gauge—3-1/2 in. spinal needles—for deep injections (rarely used)
- Ethyl chloride or PainEase vapocoolant spray
- Lidocaine: 1% plain
- Lidocaine 1% with epinephrine—used only for local anesthesia when performing knee aspirations.
- Steroid of choice (triamcinolone 40 mg/mL)
- Viscosupplementation agent of choice—ordered as needed

MUSCULOSKELETAL ULTRASOUND

There is a growing body of literature that demonstrates the efficacy of musculoskeletal ultrasound as an aid for accurate needle placement. In “expert” hands, the discrete placement of a needle tip into even a large joint may occur only half of the time. Without confirmation of needle placement by diagnostic imaging, the only way to ensure joint entry is by aspiration of synovial fluid. Ultrasound guidance of injections into joints, bursa, and tendon sheaths increases the success rate to nearly 100% in experienced hands. Imaging can be performed either at the same time of the aspiration/injection or prior to the needle procedure itself. Ultrasound guidance has the potential to improve clinical outcomes, especially in joints and tendons that are difficult to access.

If imaging is done concurrently, then the entire procedure may be performed in a sterile field using sterile gel and a sheath for the ultrasound head. Alternatively, the ultrasound imaging can be done in real time, utilizing an acoustic window adjacent to, but not directly involving, the injection site. The advantage in this situation is that the ultrasound field does not require a sterile environment and the injection/aspiration is done as usual. In both of these cases, the needle tip is guided to its target in a live image, and direct visualization of the success or failure of placement is seen and may also be recorded.

In the case of ultrasound done prior to the injection, the sonographic landmarks are noted and then marked on the skin. After prepping the skin in an antiseptic fashion, the injection/aspiration is done immediately afterward as a separate procedure. The advantage of this procedure is that it can be done by a single operator. However, it does not allow real-time imaging confirmation of placement.

TECHNIQUE

When performing injections and/or aspirations, it is important that the medical provider follows a standardized routine. This helps organize the clinician, prepares the patient, and reduces the possibility of procedural omissions. The following steps should be done in the order presented:

1. Determine the medical diagnosis and consider relevant differential diagnoses.
2. Discuss the proposed procedure and alternatives with the patient.
3. Obtain written informed consent from the patient.
4. Collect and prepare the required materials.
5. Correctly position the patient for the procedure.
6. Identify and mark the anatomic landmarks and injection site with ink. (Do not allow the patient to move the affected area from the time that the marks are placed until after the procedure is completed.)
7. Press firmly on the skin with the retracted tip of a ballpoint pen to further identify the injection site.
8. Prepare the site for injection by cleansing with an alcohol pad followed by two applications of povidone-iodine pads.
9. Allow the povidone to dry for full antibacterial effect.
10. Provide local anesthesia as indicated through use of tactile distraction, vapocoolant spray (ethyl chloride or PainEase), and/or injected local anesthesia.
11. Using the no-touch technique, introduce the needle at the injection site and advance it precisely into the treatment area.
12. Aspirate fluid (optional) and send it for laboratory examination if indicated. If injecting corticosteroid immediately following aspiration, do not remove the needle from the joint or bursa. In this case, grasp the needle hub firmly (with a hemostat clamp if necessary), twist off the original syringe, and then immediately attach the second syringe that contains the corticosteroid.
13. Inject corticosteroid solution into the treatment area. Always aspirate before injection to avoid intravascular administration. Do not inject the medication against resistance.
14. Withdraw the needle.
15. Apply direct pressure over the injection site with a gauze pad.
16. Apply an adhesive dressing.
17. Provide the patient with specific postinjection instructions.

COMPLICATIONS

Complications from injections and aspirations fall into two categories—systemic and local. Systemic complications include vasovagal reactions, lidocaine allergy, lidocaine toxicity, cardiac arrhythmias, seizures, flushing, increased blood sugars in patients with diabetes, impaired immune response, psychological disturbances, adrenal suppression, irregular menses, abnormal vaginal bleeding, and osteoporosis. Local complications may involve bleeding, infection, osteonecrosis of juxta-articular bone, ligament rupture, tendon rupture, subcutaneous atrophy, and skin depigmentation. Pneumothorax has been reported as a complication of trigger point injections of back muscles. Injuries to the radial artery can occur with attempted aspiration of large volar wrist ganglion cysts.

Patients receiving corticosteroid therapy are at increased risk for infection or reactivation of an infection due to potentially decreased immune resistance with an inability to localize infections. The risk of infection exists with any pathogen (viral, bacterial, fungal, protozoan, or helminthic) in any location of the body. Infections

may be mild or severe, and the risk for complications increases with corticosteroid dose. Also, corticosteroid therapy may mask some signs of current infection.

Steroid flare is a local reaction thought to be due to the development of steroid crystals in the soft tissue and/or synovial space. The reaction occurs 6 to 24 h following corticosteroid injection. Although steroid flare is thought to be common, this is controversial, since an identical reaction can occur from chemical synovitis due to methylparaben, a preservative. Multiuse vials of plain lidocaine, lidocaine with epinephrine, and bupivacaine all contain 1 mg of methylparaben. If a patient has a history of a steroid flare or “lidocaine allergy,” single use vials of 1% lidocaine that do not contain a preservative might be carefully used instead. In either case, an acute postinjection reaction can be managed by the use of NSAIDs and ice application after a repeat aspiration confirms that there is no infection.

AFTERCARE

Immediately following the aspiration and/or injection, apply pressure to the bandage, covering the site. Once the provider is assured that the patient is stable and is not at risk of falling, the patient should be brought down from the exam table. Gentle massage and slow range of motion should be encouraged to enable distribution of the corticosteroid throughout the joint space or soft tissues. After discharge from the office, patients should be advised to look for and immediately report any adverse reactions. Of primary importance is recognizing the early signs of infection. Therefore, any swelling, redness, increased warmth, proximal red streaking, or fever greater than 100°F should be reported immediately.

Patients often experience complete resolution of pain following injection with a local anesthetic. Because of pain relief and absence of negative feedback, there is an increased risk of further injury to the treated area. They should be informed that the initial pain relief is being provided by the injected local anesthetic and that its effect will only be temporary. In the case of plain 1% lidocaine, pain relief can be expected to last only about 1 h. The anti-inflammatory effect of the injected corticosteroid product usually has a 24 to 48 h onset of action. Patients should be informed that the pain is expected to return in about an hour and decrease again in 1 to 2 days.

Additional instructions may be given following aspiration and/or injection. The patient might be directed to apply ice to the affected area. NSAIDs may be prescribed depending on the clinical situation. Studies have shown that immobilization of the affected area is not necessary, but reduced usage and activity modification are often helpful. A compressive elastic wrap or splint might be indicated. An aftercare patient education handout that outlines the possible adverse reactions and specific instructions is a useful tool (see Appendix 2).

DOCUMENTATION OF THE PROCEDURE

A very important step in the provision of medical services is the description of the events that occurred. This serves not only as the official medical record, but also as a billing record and a legal document. The note should affirm that discussion of the proposed procedure and the alternative treatments occurred, that possible complications were discussed, and that all questions were answered. The note must include the fact that written informed consent was obtained. Then, it should document patient position, anesthesia, supplies used, and the physical steps involved in performing the procedure. There must be a record of any pertinent findings, complications encountered, and the patient's postprocedure condition. Finally, a list of patient instructions, treatment plan,

and follow-up care must be documented and signed by the medical provider and any supervisors if necessary.

See the example of documentation for a knee joint aspiration and injection in Appendix 3. This may be modified as needed to meet the needs of the specific aspiration/injection procedure, patient, provider, and medical system. A review of this document by legal representatives prior to implementation is recommended.

BILLING AND CODING

In order to receive appropriate reimbursement, it is essential that clinicians assign the proper code(s) for the procedure(s) performed. This ensures fair reimbursement for the work done at the visit. A complete description of the procedures performed during the patient encounter must be documented in the medical record in order to support the level of coding. At the time of publication, the following Current Procedural Terminology (CPT) 2009 codes are employed to bill for injections and aspirations:

- 20526—Injection, therapeutic, carpal tunnel
- 20550—Injection(s), single tendon sheath, or ligament, aponeurosis (e.g., plantar “fascia”)
- 20551—Injection(s), single tendon origin/insertion
- 20552—Injection(s), single or multiple trigger point(s) in one to two muscles
- 20553—Injection(s), trigger point(s) in three or more muscles
- 20600—Arthrocentesis, aspiration and/or injection, *small* joint or bursa
- 20605—Arthrocentesis, aspiration and/or injection, *intermediate* joint or bursa
- 20610—Arthrocentesis, aspiration and/or injection, *major* joint or bursa
- 20612—Aspiration and/or injection of ganglion cyst(s), any location
- 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

CPT 2009 defines small joints as those in the fingers and toes. Temporomandibular, acromioclavicular, wrist, elbow, ankle, and olecranon bursae are defined as intermediate joints or bursa. Large structures are the glenohumeral joint, sacroiliac joint, hip joint, knee joint, and the subacromial bursa.

According to their definitions, the CPT codes 20550, 20551, 20600, 20605, and 20610 are used once for each tendon, joint, or bursa injected. If more than one tendon, joint, or bursa is injected at a visit, then the codes are listed multiple times for each separate structure that is injected. In addition, the modifiers –51 or –59 are used to indicate when multiple procedures are performed. Usually –59 is used to code for multiple injections at different sites, but the specific modifier used is determined by the preference of each insurance carrier. Note that trigger point injection CPT codes 20552 and 20553 are used only once each session, regardless of the number of injections performed. CPT 2009 gives specific instructions when reporting multiple ganglion cyst aspirations/injections. In this case, the code 20612 is used and the modifier –59 appended.

CPT 2009 does not specifically define the proper code to be used for corticosteroid injection of either the ulnar nerve in cubital tunnel syndrome or injection of the interdigital nerves of the feet in Morton’s neuroma. While most clinicians use the tendon injection codes for this, the author feels that until CPT descriptors change, the code 64450 most accurately reflects the procedure performed in these conditions.

Medicare and most insurance companies apply the multiple surgery rule when paying for multiple injections. They reimburse 100% for the first procedure, 50% for the second, and 25% for third and subsequent procedures.

Diagnostic codes must be listed in order for an insurance company to justify payment for the injection/aspiration procedure. These codes follow the standard International

TABLE 6**2009 HCPCS J Codes for Injectables**

J-Code	Material	Unit (mg)
J3301	Kenalog	10
J3303	Aristospan	5
J1020	Depo-Medrol	20
J1030	Depo-Medrol	40
J1040	Depo-Medrol	80
J0704	Celestone Soluspan	6
J1094	Decadron-LA	1
J7322	Synvisc	16
J7324	Orthovisc	30
J7321	Hyalgan	20
J7321	Supartz	25
J7323	Euflexxa	20
J0585	Botulinum toxin type A	1
J0587	Botulinum toxin type B	1

Classification of Diseases (ICD) system. In each of the injection chapters of this book, both the most commonly used ICD-9 (<http://www.cdc.gov/nchs/icd9.htm>) and ICD-10 (<http://www.who.int/classifications/icd/en/>) codes are listed.

J codes are used to charge for the injected corticosteroid consumed during the procedure. Therapeutic injectable products, such as corticosteroids and viscosupplementation agents, are billed in addition to the injection administration codes (Table 6). The J codes are not used for local anesthetics since their use is considered a necessary part of the procedure much like the needle and syringe. The charge is reflected as the number of units used during the procedure. For instance, the J code for Kenalog is expressed in 10mg units. If the injection is done with 40mg of Kenalog, then the patient is charged four units of J3301. The most common current J codes used for injection are listed in Table 6.

An evaluation and management (E&M) code can be billed if the documentation of the visit supports the necessity and completeness of the evaluation. Otherwise, only the CPT code and associated J code can be used if a separate, distinct, medically necessary evaluation is not performed.

INFORMED CONSENT

As with any invasive procedure, informed consent must be obtained from the patient. For the purpose of documentation, this should be done in a written format. The patient must also have an adequate opportunity to ask questions including a discussion of alternative methods of diagnosis and treatment. An example of an informed consent form is included in Appendix 1.

EVIDENCE-BASED MEDICINE

Intra-articular and soft tissue steroid injections are common procedures performed by primary care physicians. They have enjoyed acceptance and are frequently used to treat various musculoskeletal conditions. Although significant therapeutic efficacy is claimed

from over 40 years of published research, a closer examination of the literature yields less convincing evidence of significant long-term improvement of specific, measured outcomes. The available data support short-term benefit from injected corticosteroids. There is currently insufficient quality data to provide a definitive answer on the efficacy of corticosteroid injections. However, lack of discrete medical evidence does not necessarily mean that these procedures are ineffective. Even gold standard evidence-based medicine resources such as Cochrane Reviews suffer from performing meta-analysis using studies with data that are flawed. New investigations that are methodologically sound are needed to measure outcomes of corticosteroid injections given for the treatment of specific conditions.

PEARLS

- Review and mark anatomic landmarks before aspirating or injecting.
- Visualize the anatomy and the procedure in three dimensions.
- Always use the no-touch technique.
- Aspirations: Use a 18-gauge needle for large joints or bursa. Use a 20-gauge needle for intermediate joints.
- Use a 25-gauge needle for small joints.
- Injections: Use a 25-gauge needle.

Chalazion

A chalazion is an acute or chronic granuloma that forms due to inflammation and obstruction in the meibomian glands (or tarsal glands) on the conjunctival surface of either the upper or the lower eyelids. The obstruction in these small sebaceous glands may occur due to allergy, acne in adolescence, or rosacea. A chalazion contains many steroid-responsive immune cells including macrophages, plasma cells, polymorphonuclear cells, and eosinophils. Patients with this condition present not uncommonly to the primary care office, and although considered self-limited, it may last for weeks to months before spontaneously disappearing. Traditional conservative treatment includes the application of local heat, lubricant eye drops, careful cleansing of the eyelid, and topical antibiotics (although this condition, unlike a hordeolum, is not an infectious process).

An often unrecognized procedure is the simple injection of a small amount of corticosteroid into the substance of the chalazion. The procedure is quick and well tolerated and results in almost uniform resolution of the chalazion lesion within days of administration. Additional advantages of this technique over traditional excision or incision/curettage include its simplicity, less pain, considerably decreased cost, no requirement of special instruments, no need for postoperative eye patching, and convenience for both the provider and the patient.

Indications	ICD-9 Code	ICD-10 Code
Chalazion	373.2	H00.1

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The patient's hands are folded in his or her lap.
- The clinician stands lateral to the patient, on the same side as the chalazion.

ANESTHESIA

- Local anesthesia of the eyelid is not used. Local injection of anesthetic into the soft tissue surrounding the chalazion causes swelling that obliterates the location of the chalazion. Topical vapocoolant spray cannot be used around the eyes. Furthermore, the needle used for the injection is very tiny at a 30-gauge size and, thus, only minimal discomfort is experienced when it is inserted into the eyelid.

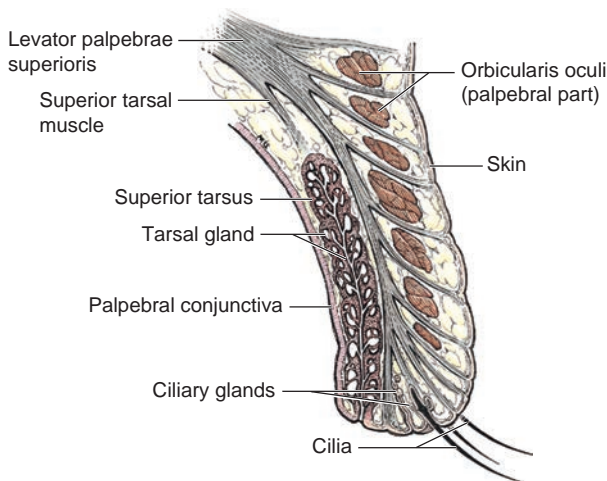


FIGURE 1 ● Superior eyelid. The tarsus forms the skeleton of the eyelid and contains the tarsal glands. (From Moore KL, Dalley AF. *Clinically Oriented Anatomy*. 5th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.)

EQUIPMENT

- 3-mL or a tuberculin syringe
- 30-gauge, 1/2 in. needle
- 0.1 mL of the steroid solution (40 mg/mL of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads

TECHNIQUE

1. Corneal eye shields may be used to protect the cornea and globe. (Ellman International Inc. 3333 Royal Ave, Oceanside, NY 11572, phone: 1-800-835-5355, web site: <http://www.ellman.com/>)
2. Prep the insertion site with alcohol followed by the povidone-iodine pads
3. A chalazion clamp may also be used, if desired, to stabilize the lesion. However, use of this instrument requires local and topical anesthesia.
4. With your fingertips, apply lateral traction to the eyelid to stretch and fix the skin.
5. Approach the eyelid from a lateral to a medial direction.
6. To ensure safety, make sure that the needle is oriented parallel to the surface of the globe of the eye.
7. Using the no-touch technique, insert the needle through the skin external to the eyelid about 0.5 cm lateral to the chalazion (Fig. 2).
8. Advance it slowly and carefully into the center of the lesion.
9. After insertion into the chalazion, confirm accurate placement by moving the needle slightly from side to side to ensure that the lesion moves with the needle.
10. Inject 0.1 mL of the steroid into the chalazion.
11. Remove the needle and apply direct pressure with the gauze pad.

AFTERCARE

- None needed.
- Consider follow-up examination in 1 week.



FIGURE 2 ● Chalazion injection.

CPT code: 68200—Subconjunctival injection

PEARLS

- After the needle has been inserted into the chalazion, confirm accurate placement by moving the needle slightly from side to side to ensure that the lesion moves with the needle.
- One third of the cases may require a second injection.
- If the chalazion continues to recur after two injections, it should be evaluated for malignancy. In this case, more aggressive traditional measures should be used, including curettage through a cruciform incision, primary excision, or excision/destruction using radiofrequency surgery.
- Potential complications may include inadvertent corneal injury, penetration of the globe, cataract from administration of steroid in the globe, and skin depigmentation.



A video clip showing a chalazion injection can be found on the book's web site.

Keloid Scar

Keloid scars occur as the result of an abnormal overgrowth of dense fibrous tissue that develops in areas of prior skin trauma. The tissue elevates above the surface of the surrounding skin, extends beyond the borders of the original wound, does not regress spontaneously, and often recurs after excision. Keloids usually occur during the second and third decades of life, with a higher prevalence in those with darker pigmented skin. They are most commonly asymptomatic but can present with itching and pain if they become irritated or enlarge.

Since surgery can make keloids worse, intralesional corticosteroid injection is the primary treatment. Corticosteroids reduce excessive scarring by decreasing collagen synthesis, suppressing vascular endothelial growth factor and decreasing production of inflammatory mediators and fibroblast proliferation during wound healing.

These injections can be done as primary treatment or following scalpel excision. If done in combination with excision, the intralesional injection of corticosteroid is typically performed 2 to 3 weeks postoperatively. The dose of triamcinolone acetonide injected at any one time ranges from 10 to 40 mg, depending on the size of the scar. Injections may be repeated at 6-week intervals until the keloid scar flattens and any discomfort is controlled. Studies examining the effects of corticosteroid injections alone show a 5-year response rate of 50% to 100%. When surgical excision is combined with steroid injection, the response rates increase to 85% to 100%.

Complications of repeated corticosteroid injections include skin atrophy, telangiectasia formation, hypopigmentation, and a depressed scar.

Indications	ICD-9 Code	ICD-10 Code
Keloid scar	701.4	L91.0

PATIENT POSITION

- Supine on the examination table.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.
- The clinician stands on the side of the patient that allows best access to the keloid scar.

ANESTHESIA

- Local anesthesia of the injection site with topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 or 1-1/2 in. needle depending on the size of the keloid
- 0.25 to 1 mL of the steroid solution (40 mg/mL of triamcinolone acetonide)

- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe parallel to the surface of the skin at the edge of the keloid with the tip of the needle directed toward the center of the keloid scar.
4. Using the no-touch technique, introduce the needle at the edge of the keloid (Fig. 1).
5. Advance the needle into the lesion.
6. Perform a uniform injection of 10 to 40 mg/mL of triamcinolone acetonide into the papillary dermis of the keloid.
7. Avoid injection into the epidermis or subcutaneous tissues.
8. Following the injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.

AFTERCARE

- None needed
- Follow-up examination in 6 weeks

CPT code: Intralesional injections—11900 (one to seven lesions) and 11901 (>seven lesions)



FIGURE 1 ● Keloid injection.

PEARLS

- If the keloid continues to recur after several injections, more aggressive measures may be used, including scalpel excisions using Z-plasty or W-plasty techniques or the injection of other agents including bleomycin, 5-fluorouracil, or interferon. Alternatively, radiation, cryosurgery, laser, and imiquimod may be employed.
- Avoid superficial injections as they may increase the likelihood of dermal complications.



A video clip showing a keloid scar injection can be found on the book's web site.

Common Wart

Patients very commonly present to the primary care office for evaluation of common warts. These verrucous structures are the focal dermal expression of human papilloma virus infections. Common warts may be treated with various modalities including cryotherapy, radiofrequency surgery, laser ablation, cautery, curettage, and injection therapy. Perilesional injection therapy has been shown to be effective in the treatment of common warts. Candida antigen introduced at the edge of the wart incites a host immune response that causes spontaneous regression. In addition, HPV-directed cell-mediated immune response plays a role in the resolution of distant untreated warts.

Candida antigen is available as “Candin” (Allermed Labs, 7203 Convoy Court, San Diego, CA 92111, phone: 1-800-221-2748, web site: <http://www.allermed.com>) or the generic (Hollister Stier Labs Inc. 3525 N. Regal, Spokane, WA 99207, phone: 1-800-992-1120, web site: <http://www.hollisterstier.com>).

Indications	ICD-9 Code	ICD-10 Code
Common warts	078.10	B07
Genital warts	078.11	A63.0
Plantar warts	078.12	B07

PATIENT POSITION

- Supine on the examination table.
- Rotate the patient’s head away from the side that is being injected. This minimizes anxiety and pain perception.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1/2 in. needle
- Up to 1 mL of 1% lidocaine without epinephrine
- Up to 1 to 4 mL of the Candida antigen
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prepare the injection solution:
 - a. For Candin: Mix equal parts of Candin and 1% lidocaine without epinephrine.
 - b. For generic: Mix one part Candida antigen to four parts 1% lidocaine without epinephrine.
2. Prep the insertion site with alcohol followed by the povidone-iodine pads.
3. Achieve good local anesthesia by using topical vapocoolant spray.
4. Position the needle and syringe parallel to the surface of the skin at the edge of the wart with the tip of the needle directed toward the wart.
5. Using the no-touch technique, introduce the needle about 0.5 mL from the edge of the wart (Fig. 1).
6. Advance the needle into the dermis at the edge of the wart.
7. Perform an intradermal injection immediately adjacent to the wart using 0.1 to 0.3 mL of the solution per wart. Limit total amount at any one visit to 1 mL
8. Avoid injection into the subcutaneous tissues.
9. Following injection of the solution, withdraw the needle.
10. Apply a sterile adhesive bandage.

AFTERCARE

- None needed.
- Instruct the patient to expect the following local symptoms postinjection as their immune system is reacting to the antigen: itching, drying of the wart, lesion turning a black color, peeling of the treated tissue, spontaneous regression, and localized erythema.
- Consider follow-up examination in 2 to 4 weeks.

CPT code: Intralesional injections—11900 (one to seven lesions) and 11901 (>seven lesions)



FIGURE 1 ● Common wart injection.

PEARLS

- Candida antigen should not be used after a previous unacceptable adverse reaction such as extreme hypersensitivity or allergy to this antigen or to a similar product.
- Adverse reactions may include rash, adenopathy, and persistence of wart(s).
- Repeat injection in one month if there is any residual wart.
- 65% to 75% of warts treated with Candida antigen injection resolve after the first injection.
- 50% of the remaining warts respond after a second injection.
- There is no listed J code for Candida antigen. As such, insurance companies do not provide reimbursement for the antigen. Unfortunately, the injection code does not cover this cost and the antigen itself is more expensive than the reimbursement for the procedure. Therefore, if providing this treatment, consider asking the patient to fill a prescription at a pharmacy, bring the injectable to the office, and then perform the procedure.



A video clip showing a common wart injection can be found on the book's web site.

Temporomandibular Joint

Patients commonly present to the primary care office for evaluation of jaw pain from temporomandibular joint dysfunction and/or arthritis. Injection of corticosteroid into the temporomandibular joint (TMJ) space is an effective treatment option for this difficult-to-treat condition. More recently, research is showing safe and effective treatment using hyaluronic acid. The Food and Drug Administration has not approved hyaluronic acid for clinical use at the time of this publication.

Indications	ICD-9 Code	ICD-10 Code
TMJ dysfunction	524.60	K07.6
Jaw sprain	848.1	S03.4
TMJ arthritis, unspecified	716.98	M13.98
TMJ arthrosis, primary	715.18	M19.08
TMJ arthrosis, posttraumatic	716.18	M19.18
TMJ arthrosis, secondary	715.28	M19.28

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

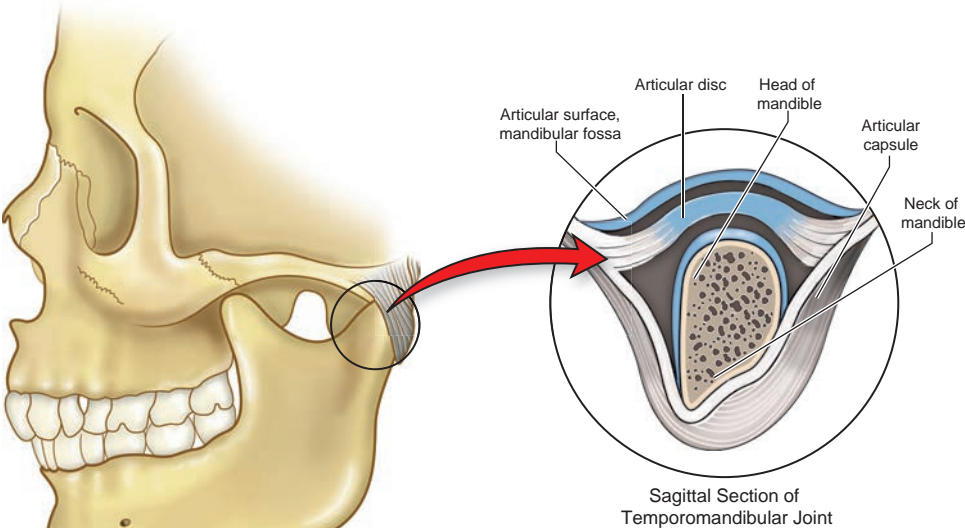
- Sitting on the exam table.
- The patient's hands are folded in his or her lap.

LANDMARKS

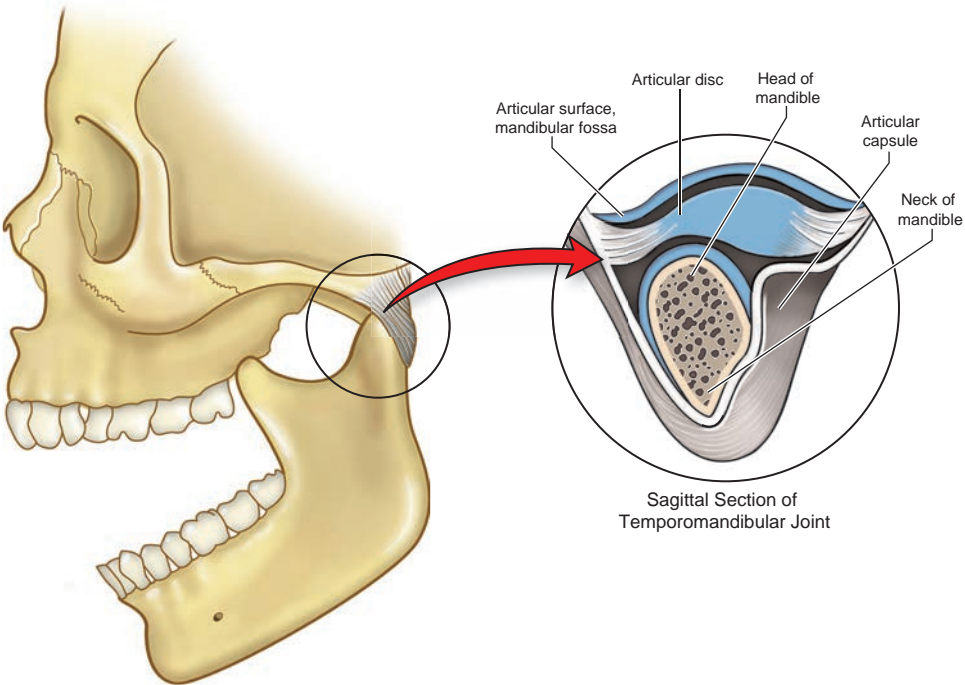
1. With the patient seated on the exam table, the clinician stands lateral and posterior to the affected jaw.
2. Palpate the TMJ with the mouth in the closed and then the fully open positions.
3. Identify the sulcus that forms with jaw opening and mark that spot with ink.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the jaw.
6. The patient must keep his or her mouth open until the completion of the procedure.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray may be used but is not necessary in most patients. If using a spray, make sure that "overspray" of the vapocoolant chemical does not enter the patient's eyes or external ear canal.



A



B

FIGURE 1 ● Sagittal view of the Temporomandibular Joint. **A:** Jaw closed. **B:** Jaw open.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe from a posterior approach at a 30-degree angle to the sagittal plane into the sulcus with the tip of the needle directed anteromedial toward the posterior aspect of the TMJ.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the joint until the needle tip is located in the joint capsule. There will be a decrease in resistance when entering the joint capsule. After entering the joint space, the needle will touch the articular surface or the articular disc. Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus into the TMJ articular capsule. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her jaw through its full range of motion. This movement distributes the steroid solution throughout the joint capsule.
10. Reexamine the TMJ in 5 min to confirm pain relief.



FIGURE 2 ● TMJ injection.

AFTERCARE

- Avoid excessive use of the jaw by avoiding chewing gum, chewing tough foods, and excessive talking over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Arthrocentesis, aspiration, and/or injection of the intermediate joint or bursa

PEARLS

- Be aware that there are reports of articular degeneration following corticosteroid joint injections.



A video clip showing a TMJ injection can be found on the book's web site.

Greater Occipital Neuralgia

Patients occasionally present to the primary care office for the treatment of headaches caused by greater occipital neuralgia. This condition is a result of compression of the C2 sensory fibers supplying the greater occipital nerve. Etiologies include neck injury from head trauma or whiplash, repetitive neck movements, prolonged muscle contraction/spasm, osteoarthritis, tumors, rheumatoid arthritis, syphilis, and herpes zoster. The pain from greater occipital neuralgia occurs unilaterally over the occipital/neck junction. It is usually described as a dull aching pain with exacerbations of piercing, throbbing, or electric shock–like pain. Typically, the pain of occipital neuralgia begins in the neck and then spreads to the vertex, ear, frontal area, or even the eyes. Diagnosis is made on the basis of history and reproduction of the pain upon compression of the greater occipital nerve against the edge of the occiput. Various treatments of the pain include chiropractic manipulation, local nerve block, injection of corticosteroids, antidepressants, antiseizure medications, peripheral nerve stimulation, occipital cryoneurolysis, rhizotomy, surgical neurolysis, or microdecompression.

Indications	ICD-9 Code	ICD-10 Code
Occipital neuralgia	723.8	M79.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Sitting on an exam stool with neck flexed and leaning forward with arms resting on the exam table.

LANDMARKS

1. With the patient seated on the exam stool, the clinician stands directly behind the patient.
2. Find the external occipital protuberance of the occipital bone in the midline.
3. Palpate 2 to 3 cm lateral to the midline along the superior nuchal line. At the point where the greater occipital nerve courses over the occipital bone, pressure over the nerve will elicit pain. Mark that spot with an ink pen.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the neck.

ANESTHESIA

- Local anesthesia of the skin with topical vapocoolant spray may be used, but is not necessary in most patients.

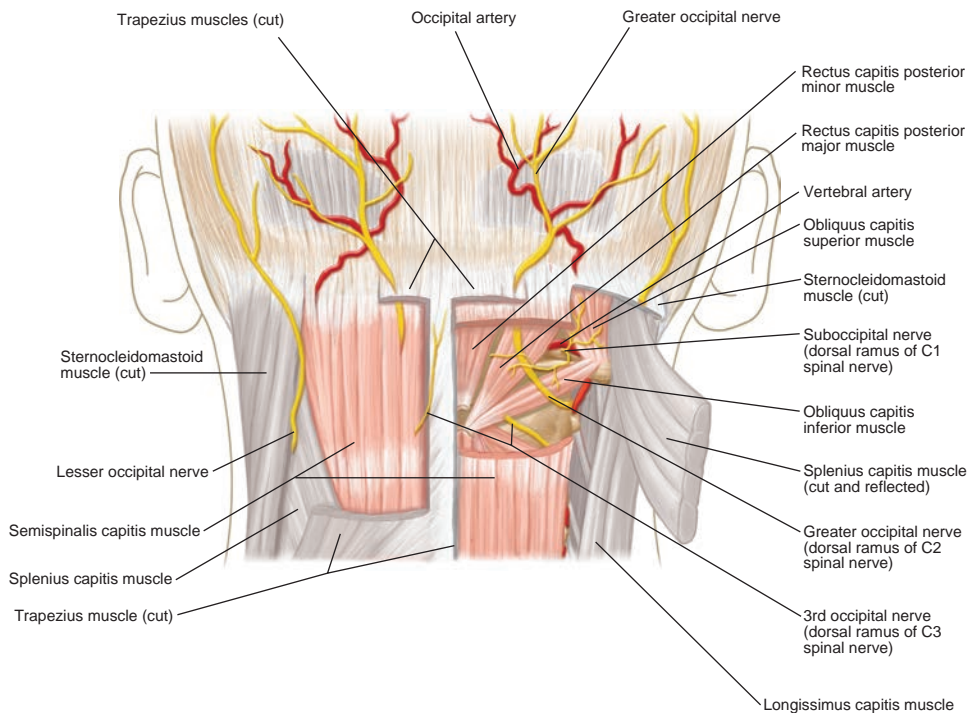


FIGURE 1 ● Suboccipital region. (From Tank PW, Gest TR. *Lippincott Williams & Wilkins Atlas of Anatomy*. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Part the hair and prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray (optional).
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed anteriorly toward the nuchal line of the occiput.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the location of the greater occipital nerve until the needle tip contacts the occiput at the superior nuchal line. Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus around the greater occipital nerve. The injected solution should flow smoothly into the tissues. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.



FIGURE 2 ● Greater occipital neuralgia injection.

9. Instruct the patient to gently massage the area with a piece of gauze. This movement distributes the steroid solution around the nerve.
10. Reexamine the greater occipital nerve in 5 min to confirm pain relief.

AFTERCARE

- NSAIDs, ice, physical therapy, chiropractic manipulation, or other modalities as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 64405—Injection of greater occipital nerve

PEARLS

- Take time to learn this injection that is safe, effective, and straightforward to perform.



A video clip showing a greater occipital neuralgia injection can be found on the book's web site.

Cervical Strain and Sprain

Patients very commonly present to the primary care office for evaluation and treatment of neck strain and sprain. These conditions are the result of acute injury or chronic repetitive motion. Depending on the biomechanics involved, any of the neck muscles shown below in the anatomic plates may be injured. Intramuscular injections of anesthetic may be helpful in cases where the diagnosis is unclear. Corticosteroid injections are not indicated for the treatment of acute trauma. However, they may play a role in managing inappropriate inflammation causing chronic pain. Botulinum toxin A injections have utility when injected into cervical trigger points in the treatment of whiplash-associated headache pain. Epidural, nerve root, and facet joint injections are outside the scope of this text.

Indications

Cervical sprain and strain

ICD-9 Code

847.0

ICD-10 Code

S13.4

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Sitting on an exam stool with the neck flexed and leaning forward with the arms resting on the exam table.

LANDMARKS

1. With the patient seated on the exam stool, the clinician stands directly behind the patient.
2. Locate the cervical spinous processes of the posterior neck.
3. Palpate the area of maximal tenderness in the muscles of the posterior neck. Direct pressure over this area will elicit pain and is often associated with muscle spasm. Mark the spot(s) with an ink pen.
4. At the injection site(s), press firmly on the skin with the retracted tip of a ballpoint pen. The indentation(s) represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the neck.

ANESTHESIA

- Local anesthesia of the skin with topical vapocoolant spray may be used as needed, but is not mandatory.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle

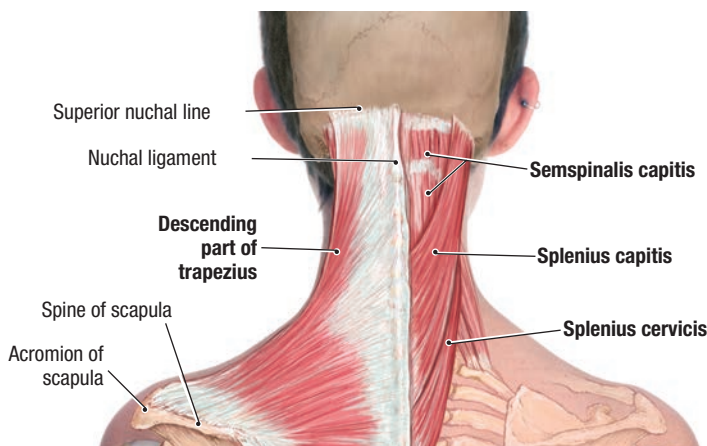


FIGURE 1 ● Posterior cervical region: Trapezius. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

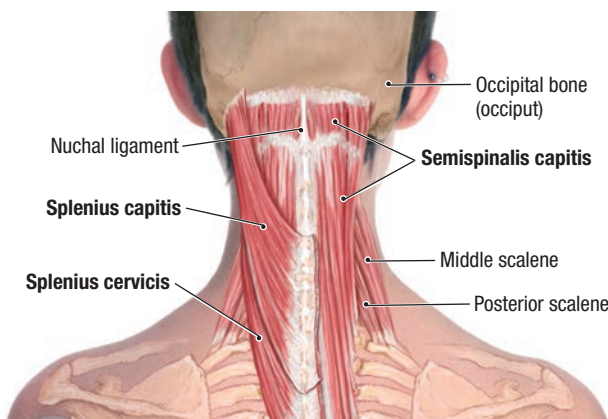


FIGURE 2 ● Posterior cervical region: Semispinalis. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the target muscle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 3).
5. Advance the needle into the body of each muscle, delivering the full volume of the syringe divided between all of the sites. If only one site is located, then only give half of the volume of the syringe into that spot.



FIGURE 3 ● Cervical strain and sprain injection.

6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to massage the area and move his or her neck slowly through its full range of motion. This movement distributes the steroid solution in the injected muscles.
9. Reexamine the neck in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the neck over the next 2 weeks.
- Consider the use of a cervical collar.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT codes

20552—Injection of trigger point(s) in 1 to 2 muscle groups

20553—Injection of trigger point(s) in 3+ muscle groups

These codes are used only once each session, regardless of the number of injections.

PEARLS

- When injecting into neck structures, always make certain to aspirate before giving the injection because of the rich network of blood vessels.



A video clip showing a cervical strain injection can be found on the book's web site.

Subacromial Space Injection—Posterior Approach

Patients commonly present to the primary care office for evaluation of shoulder pain. Almost all shoulder disorders that can be treated by injection therapy involve the rotator cuff complex. These disorders are either primary from acute injury—usually superimposed on chronic degeneration—or secondary to impingement. Since the subacromial space encompasses the rotator cuff complex as well as the proximal aspect of the biceps tendon, it allows easy access to these structures for corticosteroid treatment. In patients with longstanding degenerative disease, the subacromial bursa commonly perforates into the glenohumeral joint creating communication between the two structures.

The posterior approach to the subacromial space is the easiest to perform and is well accepted by patients. Since they cannot see the approaching needle, anxiety is diminished. A small diameter needle is appropriate as this technique is only used to inject anesthetic and/or steroid solution into the subacromial space. A large diameter needle is not necessary since fluid does not collect in the space. The posterior approach is considered a safe procedure since there are no major arteries or nerves in the immediate path of the needle.

Indications	ICD-9 Code	ICD-10 Code
Shoulder pain	719.41	M25.51
Rotator cuff sprain	840.4	S43.4
Rotator cuff tendonitis	726.10	M75.1

Using local anesthetic without steroid, this injection can help the clinician differentiate the cause of vague shoulder pain. Relief of pain after the local anesthetic is injected into the space confirms the presence of subacromial pathology. This is known as the “impingement test.”

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Sitting on the examination table.
- The patient’s hands are folded in his or her lap. The hand of the shoulder that is not involved is placed over the hand of the shoulder that is to be injected.
- This allows consistency of positioning of the shoulder so that the landmarks do not change from the time that they are identified and marked until the time of injection.

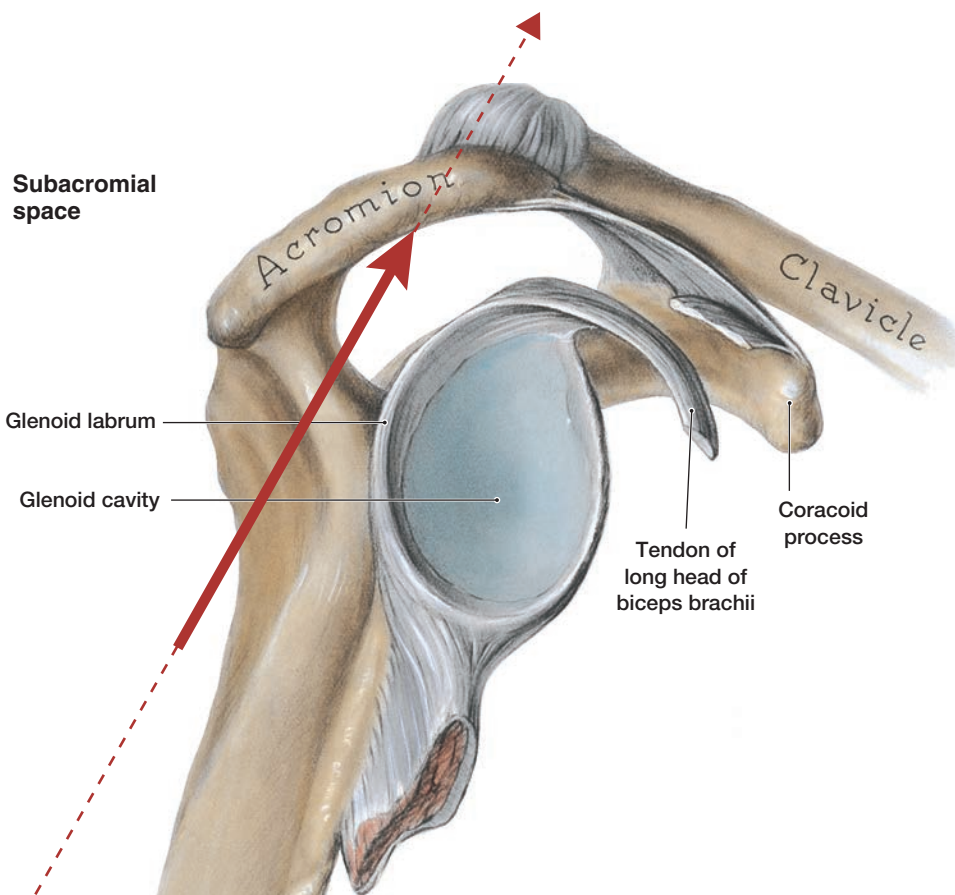


FIGURE 1 ● Right lateral shoulder (red arrow indicates path of the needle). (Adapted from Agur A, Lee MJ. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:456.)

LANDMARKS

1. With the patient seated on the examination table, the clinician stands lateral and posterior to the affected shoulder.
2. Find the lateral edge of the acromion and mark it with an ink pen.
3. Palpate the posterior edge of the acromion and mark that.
4. Having identified the posterior lateral corner of the acromion, drop a vertical line down from that point and mark a spot 2 cm below the posterior lateral corner.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. Next, identify the target site by placing the index finger of your nondominant hand over the superior aspect of the acromion posterior to the AC joint. This will be the target for the tip of the needle (Fig. 3). If your index finger is at the target site—on top of the acromion—it will be protected from accidental needle stick.
7. After the landmarks are identified, the patient should not move the shoulder or arm.

ANESTHESIA

- Local anesthesia of the skin with lidocaine or topical vapocoolant spray is not necessary in most patients.

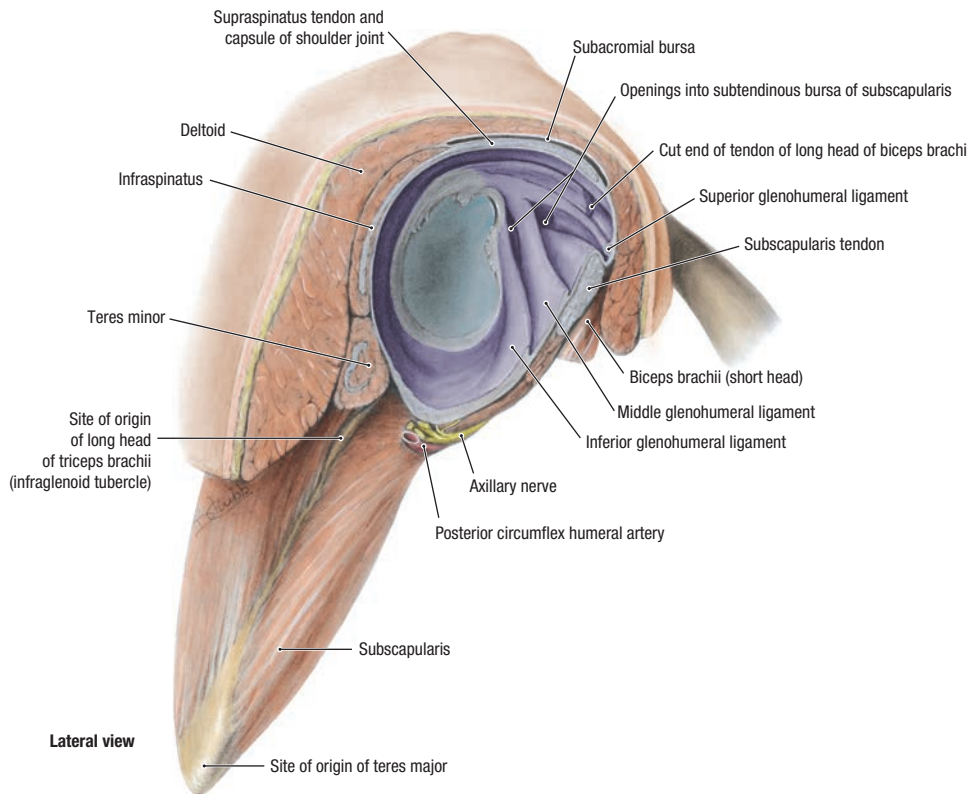


FIGURE 2 ● Interior of right shoulder. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

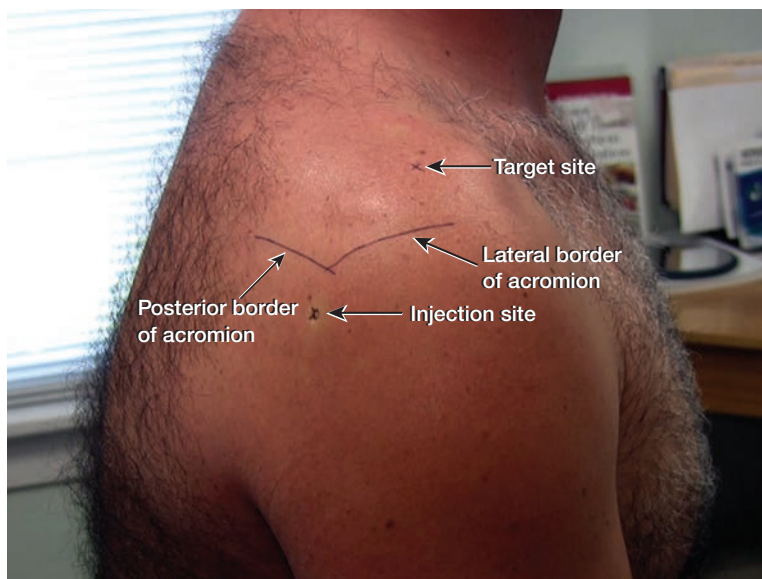


FIGURE 3 ● Right shoulder injection landmarks.

EQUIPMENT

- 10mL syringe
- 25-gauge, 1-1/2 in. needle. (Consider 3-1/2 in., 25-gauge needles in large individuals.)
- 8mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Position the needle and syringe at about a 30 degree angle to the skin with the needle tip directed cephalad toward the acromion.
3. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
4. Get underneath the acromion and advance the needle toward the target until the needle tip touches the undersurface of the acromion. Back up the needle 1 to 2 mm.
5. Inject the steroid solution as a bolus into the subacromial space. The injected solution should flow smoothly into the space. Increased resistance may indicate that the injected fluid is entering the supraspinatus muscle or tendon. In that case, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.



FIGURE 4 ● Right shoulder subacromial space injection.

AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Injection of major joint or bursa

PEARLS

- The correct identification of the acromion landmarks is more difficult than many primary care providers realize. Make sure to take your time and recheck the landmarks before proceeding with the injection.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- Ensure that the needle is underneath the acromion before advancing it toward the target finger.
- Always keep your target finger over the acromion to protect it from accidental needle stick.



A video clip showing a subacromial space injection can be found on the book's web site.

Glenohumeral Joint—Posterior Approach

The glenohumeral (GH) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the limited space available in patients with adhesive capsulitis. Both anterior and posterior approaches can be used. For reasons listed in the previous chapter, the posterior approach is preferred. One uses the same injection site identified above in the Subacromial Space Injection chapter. Since the long head of the biceps tendon has its origin within the joint capsule, a GH joint injection offers an approach to tendonitis of this structure.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the joint space. A large diameter needle is not necessary since a significant amount of fluid usually does not collect in the joint capsule.

Indications	ICD-9 Code	ICD-10 Code
Shoulder pain	719.41	M25.51
Shoulder adhesive capsulitis	726.0	M75.0
GH joint arthritis, unspecified	716.91	M13.91
GH joint arthrosis, primary	715.11	M19.01
GH joint arthrosis, post-traumatic	716.11	M19.11
GH joint arthrosis, secondary	715.21	M19.21

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Sitting on the examination table.
- The patient's hands are folded in his or her lap. The hand of the shoulder that is not involved is placed over the hand of the shoulder that is to be injected.

LANDMARKS

1. With the patient seated on the examination table, the clinician stands lateral and posterior to the affected shoulder.
2. Find the lateral edge of the acromion and mark it with an ink pen.
3. Palpate the posterior edge of the acromion and mark that.
4. Having identified the posterior lateral corner of the acromion, drop a vertical line down from that point and mark a spot 2 cm below the posterior lateral corner.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.

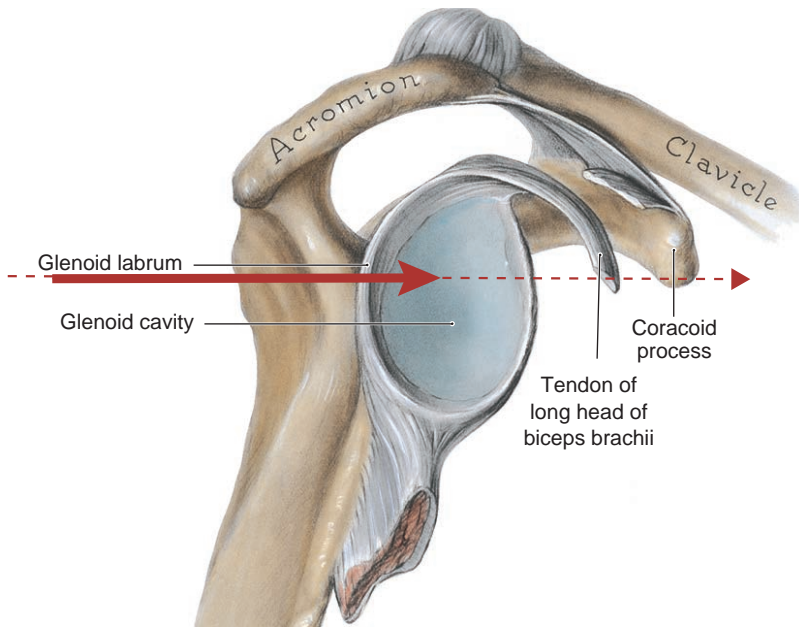


FIGURE 1 ● Right lateral shoulder (red arrow indicates path of the needle). (Adapted from Agur A, Lee MJ. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:456.)

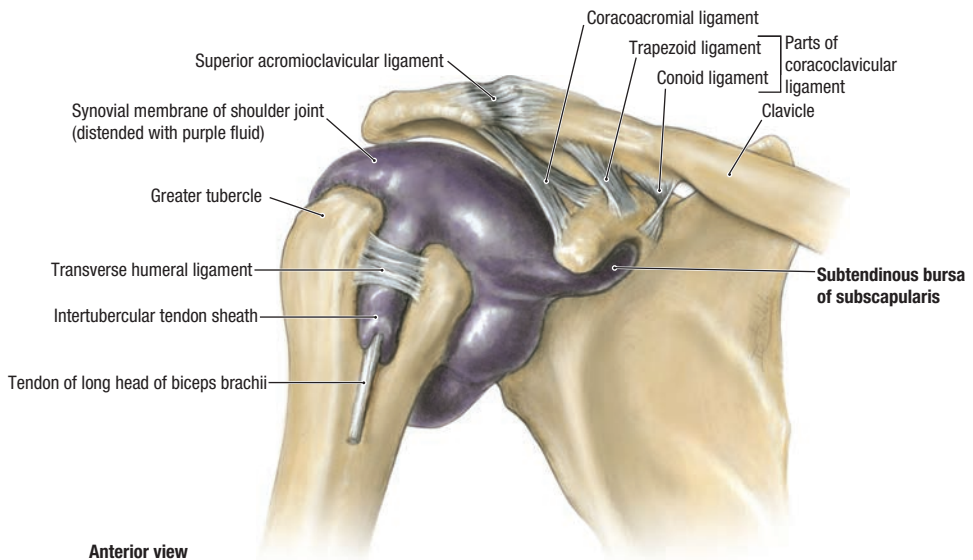


FIGURE 2 ● Right GH joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

- Next, identify the target site by placing the index finger of your nondominant hand over the coracoid process. This will be the target for the tip of the needle.
- After the landmarks are identified, the patient should not move the shoulder or arm.

ANESTHESIA

- Local anesthesia of the skin with lidocaine or topical vapocoolant spray is not necessary in most patients.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle.
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

- Prep the insertion site with alcohol followed by the povidone-iodine pads.
- Position the needle and syringe perpendicular to the skin with the needle tip directed anterior toward the coracoid process.
- Using the no-touch technique, introduce the needle at the insertion site (Fig. 3).
- Advance the needle toward the target until the needle tip touches the humeral head. Back up the needle 1 to 2 mm.



FIGURE 3 ● GH joint injection—posterior approach.

5. Inject the steroid solution as a bolus into the GH joint. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Injection of major joint or bursa

PEARLS

- The correct identification of the acromion landmarks is more difficult than many primary care providers realize. Make sure to take your time and recheck the landmarks before proceeding with the injection.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- A smaller volume of lidocaine is used in this injection compared to the subacromial space injection because the joint capsule is frequently contracted—especially in patients with adhesive capsulitis.



A video clip showing a GH joint injection can be found on the book's web site.

Glenohumeral Joint— Anterior Approach

The glenohumeral (GH) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the limited space available in patients with adhesive capsulitis. Because the physician is operating in front of the patient, this technique generates much more patient anxiety and perceived pain. For these reasons, the posterior approach is preferred. Since the long head of the biceps tendon has its origin within the joint capsule, a GH joint injection offers an approach to tendonitis of this structure.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the joint space. A large diameter needle is not necessary since a significant amount of fluid usually does not collect in the joint capsule.

Indications	ICD-9 Code	ICD-10 Code
Shoulder pain	719.41	M25.51
Shoulder adhesive capsulitis	726.0	M75.0
GH joint arthritis, unspecified	716.91	M13.91
GH joint arthrosis, primary	715.11	M19.01
GH joint arthrosis, posttraumatic	716.11	M19.11
GH joint arthrosis, secondary	715.21	M19.21

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Sitting on the examination table.
- The patient's hands are folded in his or her lap.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient seated on the examination table, the clinician stands lateral and anterior to the affected shoulder.
2. Identify the coracoid process. This is the hard and somewhat tender knob of bone immediately medial to the humeral head.
3. The injection point is just 1 cm lateral to the coracoid process.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. Find the lateral edge of the acromion and mark it with an ink pen.

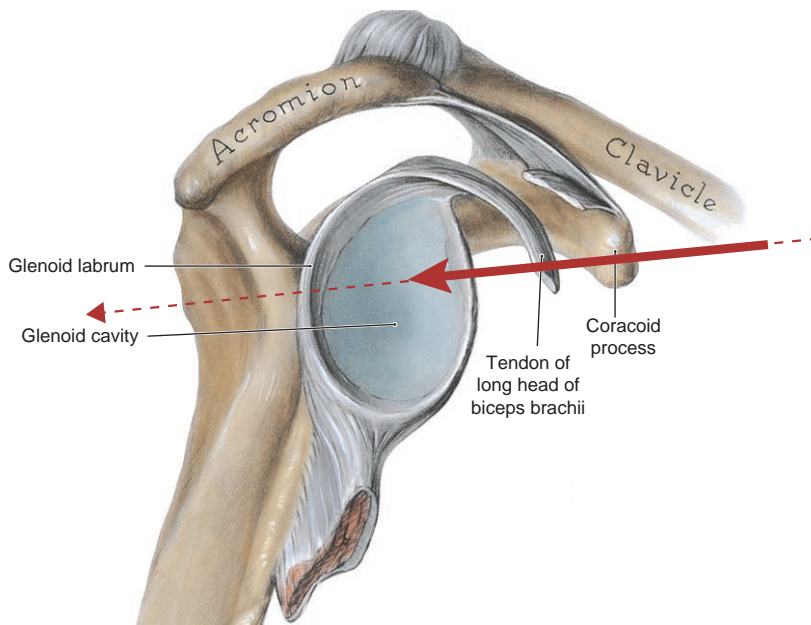


FIGURE 1 ● Right lateral shoulder (red arrow indicates path of the needle). (Adapted from Agur A, Lee MJ. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:456.)

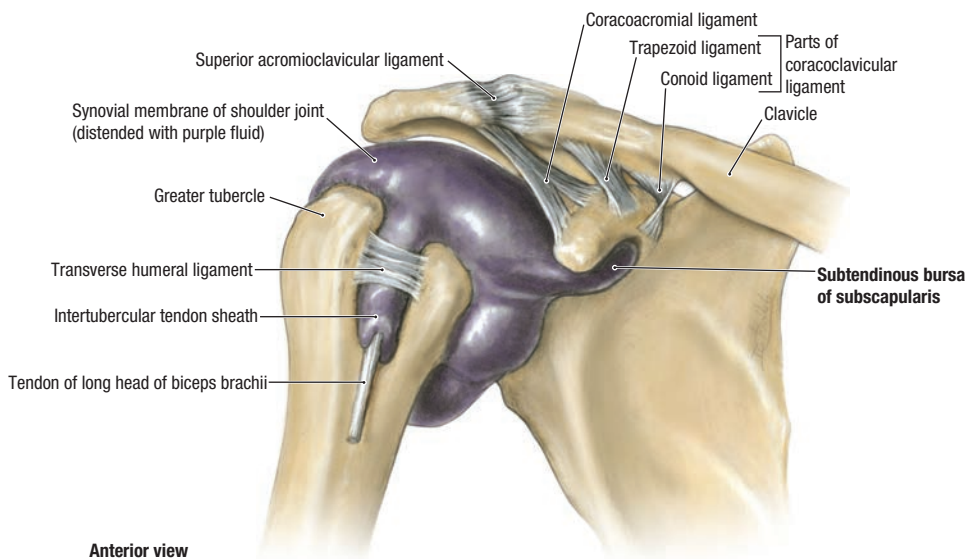


FIGURE 2 ● Right GH joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

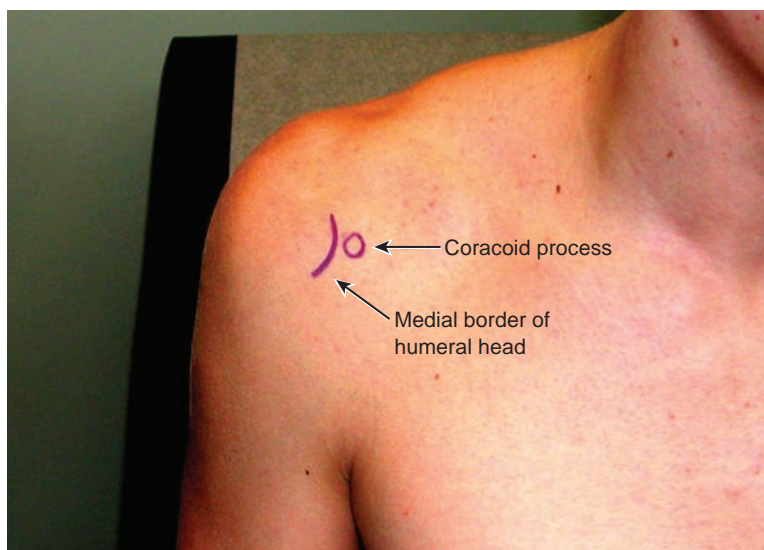


FIGURE 3 ● Anterior right shoulder landmarks.

6. Palpate the posterior edge of the acromion and mark that.
7. Having identified the posterior lateral corner of the acromion, drop a vertical line down from that point and mark a spot 2 cm below the posterior lateral corner. This will be the target for the tip of the needle (Fig. 3).
8. Once the landmarks are identified, the patient should not move the shoulder or arm.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle. (Consider longer, 25-gauge needles in large individuals.)
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two providone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the providone-iodine pads.
2. Position the needle and syringe perpendicular to the skin with the needle tip directed posterior toward the target site 2 cm caudad to the posterior lateral corner of the acromion.
3. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
4. Advance the needle toward the target until the needle tip touches the humeral head. Back up the needle 1 to 2 mm.



FIGURE 4 ● GH joint injection—anterior approach.

5. Inject the steroid solution as a bolus into the GH joint. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Injection of major joint or bursa

PEARLS

- When palpating to determine the location of the coracoid, use the fingertips of your index, middle, and ring fingers. Firmly palpate the humeral head and methodically move in a lateral-to-medial direction. Mark the site where your fingers meet the coracoid.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- A smaller volume of lidocaine is used in this injection compared to the subacromial space injection because the joint capsule may be stenosed—especially in patients with adhesive capsulitis.

Acromioclavicular Joint

The acromioclavicular (AC) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the small joint space. A small diameter needle is appropriate as this technique is only used to inject steroid solution into the AC joint.

Indications	ICD-9 Code	ICD-10 Code
AC joint pain	719.41	M25.51
AC joint sprain	840.0	S43.5
AC joint subluxation/dislocation	831.04	S43.1
AC joint arthritis, unspecified	716.91	M13.91
AC joint arthrosis, primary	715.11	M19.01
AC joint arthrosis, posttraumatic	716.11	M19.11
AC joint arthrosis, secondary	715.21	M19.21

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Sitting or lying supine on the examination table.
- The patient's hands are folded in his or her lap.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient seated or lying supine on the examination table, the clinician stands lateral and anterior to the affected shoulder.
2. Identify the AC joint. Palpate the clavicle in a medial-to-lateral direction. At the lateral aspect of the clavicle, there is a small depression that will be tender in the above conditions.
3. The injection point is located directly over the AC joint. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. Once the landmarks are identified, the patient should not move the chest or shoulder.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

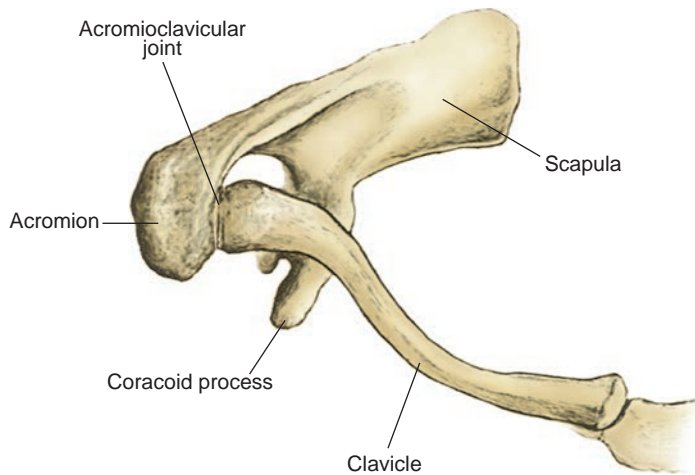


FIGURE 1 ● Right AC joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed caudad.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the AC joint space.
6. Inject the steroid solution as a bolus into the AC joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the AC joint.
10. Reexamine the shoulder in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.

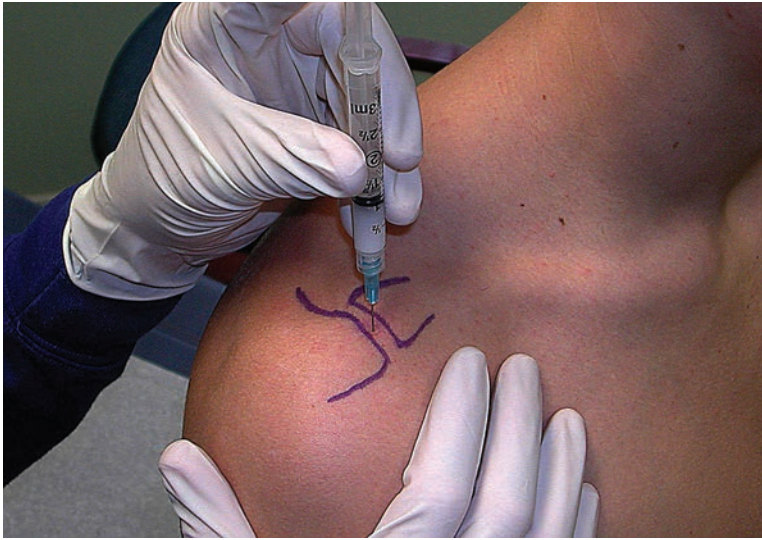


FIGURE 2 ● AC joint injection with landmarks.

- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20600—Injection of small joint

PEARLS

- The AC joint is superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.

Sternoclavicular Joint

The sternoclavicular (SC) joint is an uncommon injection site for most primary care physicians. Successful injection can be difficult because of the small joint space.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the SC joint.

Indications	ICD-9 Code	ICD-10 Code
SC joint pain	719.41	M25.51
SC joint sprain	848.41	S43.6
SC joint subluxation/dislocation	739.61	S43.2
SC joint arthritis, unspecified	716.91	M13.91
SC joint arthrosis, primary	715.11	M19.01
SC joint arthrosis, post-traumatic	716.11	M19.11
SC joint arthrosis, secondary	715.21	M19.21

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table.
- The patient's hands are folded across his or her abdomen.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands to the patient's side.
2. Identify the SC joint. Palpate the clavicle in a lateral-to-medial direction. At the medial aspect of the clavicle, there is a small depression that represents the SC joint. This structure will be tender.
3. It may be helpful to rotate the ipsilateral shoulder in order to more easily identify the SC joint.
4. The injection point is directly over the SC joint.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the chest or shoulder.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

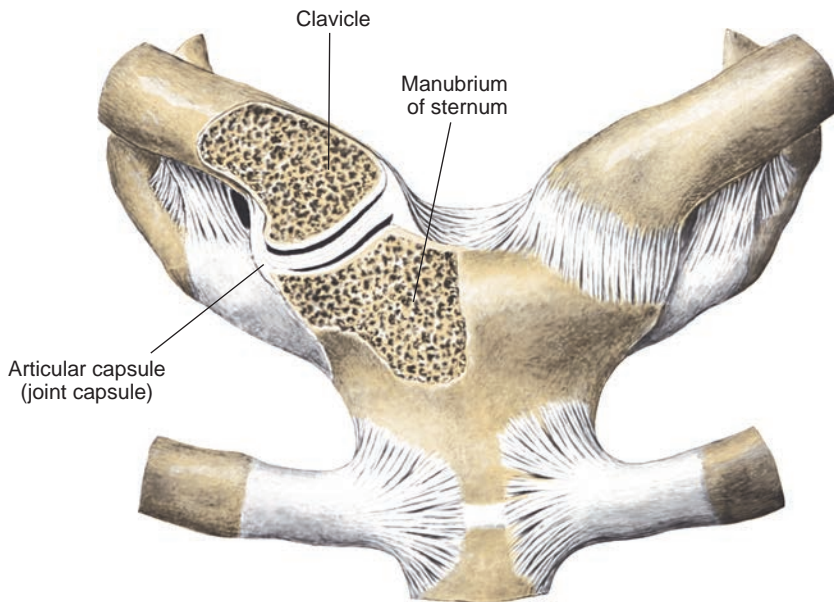


FIGURE 1 ● SC joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the SC joint space.
6. Inject the steroid solution as a bolus into the SC joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the SC joint.
10. Reexamine the SC joint in 5 min to confirm pain relief.



FIGURE 2 ● SC joint injection with landmarks.

AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20600—Injection of small joint

PEARLS

- The SC joint is superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.

Bicipital Tenosynovitis— Long Head

Patients occasionally present to the primary care office for evaluation and treatment of bicipital tendonitis. This is an inflammatory/degenerative condition more frequently seen in the long head than the short head of the biceps brachii muscle. It develops either from direct acute trauma or chronic overuse in throwing athletes and nonathletes who use their arms to do repetitive biceps contraction, resisted forearm supination, or overhead work. Bicipital tendinitis is frequently diagnosed in association with rotator cuff disease as a component of the impingement syndrome or secondary to intra-articular pathology, such as labral tears. Local tenderness is usually located over the bicipital groove of the humerus. Treatment usually involves corticosteroid injections and physical therapy.

Indications

Bicipital tenosynovitis

ICD-9 Code

726.12

ICD-10 Code

M75.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The patient's hands are placed in a position of supination at his or her side with slight external rotation of the arm.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral and posterior to the affected arm.
2. Instruct the patient to flex the elbow and contract the biceps muscle.
3. Palpate the course of the long head of the bicipital tendon over the anterior aspect of the upper arm.
4. Determine the location of maximal tenderness which will most likely be under the edge of the pectoralis major muscle. Mark that spot with an ink pen.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the shoulder or arm.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

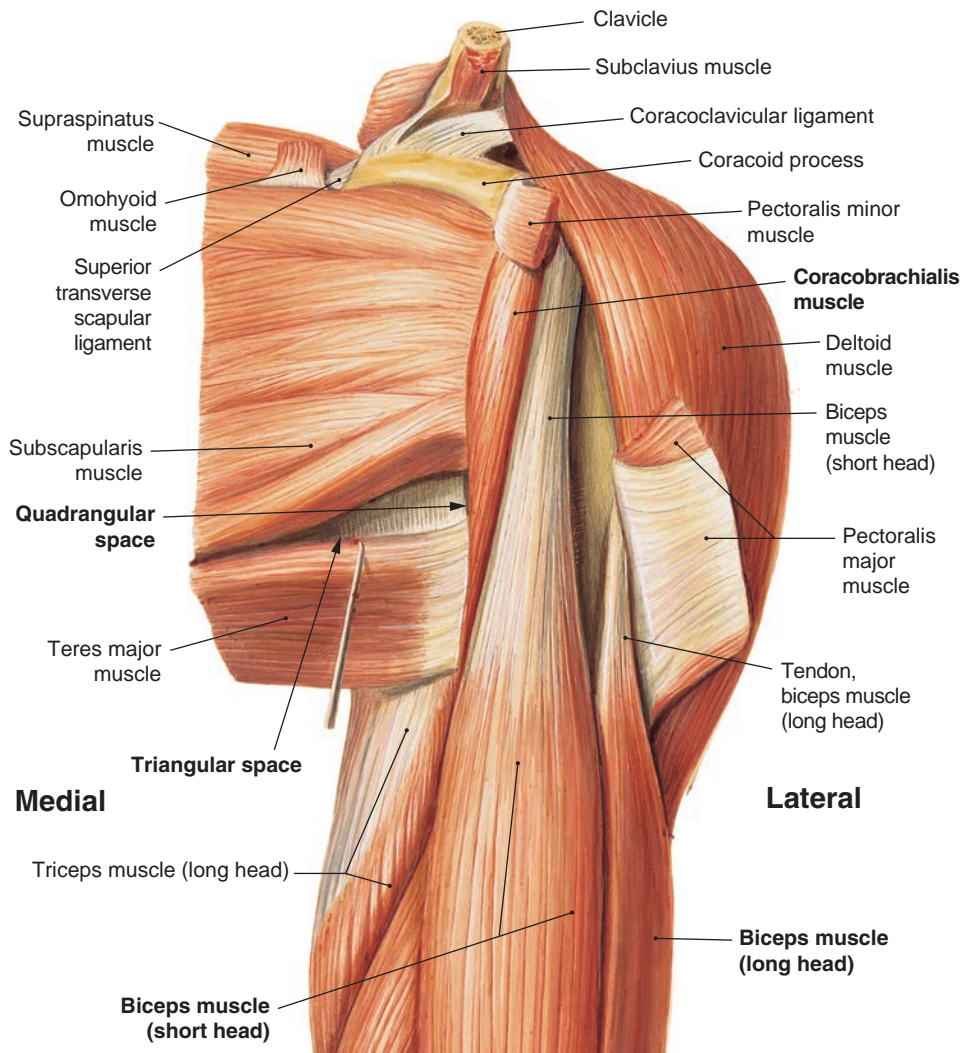


FIGURE 1 ● Muscles of anterior left arm. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.



FIGURE 2 ● Bicipital tenosynovitis injection.

3. Position the needle and syringe at a 45-degree angle to the skin with the needle tip directed proximally.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until the needle tip touches the tendon. (An increase in resistance will be detected.) Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus around the bicipital tendon. The injected solution should flow smoothly into the tenosynovial sheath. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her biceps muscle and shoulder through their full range of motion. This movement distributes the steroid solution throughout the tenosynovial sheath.
10. Reexamine the arm in 5 min to confirm pain relief.

AFTERCARE

- Avoid all throwing and excessive use of arm and shoulder over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of single tendon sheath

PEARLS

- Failure to recognize or treat this condition may lead to rupture of the long head of the biceps brachii tendon.

- Make sure to place the injection around the tendon and not into the substance of the tendon in order to prevent iatrogenic degeneration of the tendon and rupture.
- Subacromial or glenohumeral joint steroid injections are recommended for persistent cases of bicipital tendinitis.



A video clip showing a bicipital tenosynovitis injection can be found on the book's website.

Cubital Tunnel Syndrome

Cubital tunnel syndrome is an uncommon condition encountered by primary care physicians. It occurs when the ulnar nerve becomes entrapped in the cubital tunnel posterior to the medial epicondyle. Treatment of this usually involves conservative measures including avoidance of predisposing repetitive movements, nighttime application of an elbow brace and NSAIDs. Corticosteroid injection of the cubital tunnel may bring pain relief. Care must be used to avoid injury to the ulnar nerve. Successful treatment may require surgical transposition of the nerve over the medial epicondyle.

Indications	ICD-9 Code	ICD-10 Code
Cubital tunnel syndrome	354.2	G56.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- Shoulder at 30 degrees of abduction and full external rotation.
- The affected elbow is flexed at 90 degrees.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the medial epicondyle of the humerus.
3. Identify and mark the course of the ulnar nerve in the ulnar groove posterior to the medial epicondyle.
4. Mark the point of maximal tenderness over the ulnar nerve. This is usually just posterior to the medial epicondyle.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

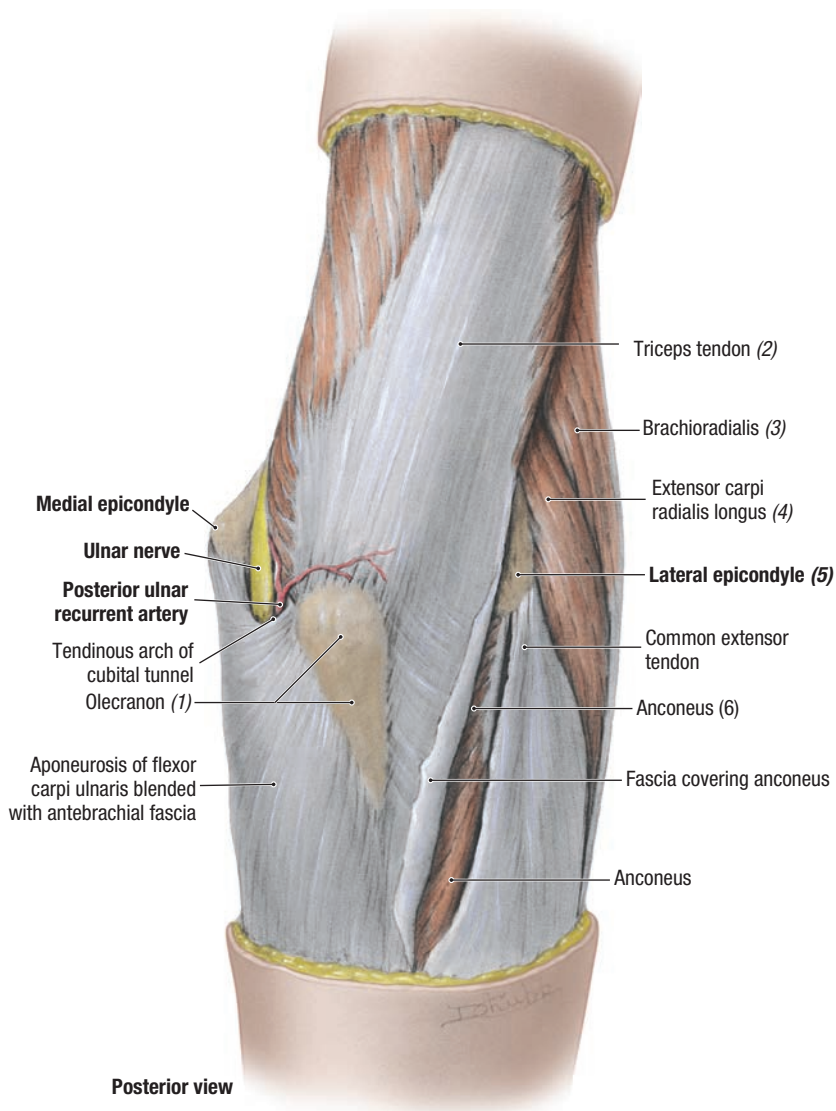


FIGURE 1 ● Right posterior elbow. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad



FIGURE 2 ● Right cubital tunnel injection.

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 30 degree angle to the skin with the tip of the needle directed distally along the ulnar nerve.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle slowly at a shallow angle to a position just along the side of the ulnar nerve.
6. If any pain, paresthesias or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. When the needle is placed along the ulnar nerve, slowly deposit the steroid solution as a bolus around that structure.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Instruct the patient to move their wrist and elbow through their full range of motion.
12. Reexamine the elbow in 5 min to confirm pain relief and the development of numbness in the distribution of the ulnar nerve from the local anesthetic.

AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use an elbow extension brace while sleeping to avoid excessive elbow flexion.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

Elbow Joint

Aspiration and injection of the elbow joint are uncommon procedures in most primary care practices. Tense collections of blood distending the elbow joint develop with fractures of the radial head. Significant pain relief follows aspiration. Arthritis in the elbow most commonly occurs due to rheumatoid arthritis, gout, and osteoarthritis. This may respond to corticosteroid injection.

Indications	ICD-9 Code	ICD-10 Code
Elbow pain	729.5	M25.52
Elbow sprain	841.9	S53.4
Elbow joint arthritis, unspecified	716.92	M13.92
Elbow joint arthrosis, primary	715.12	M19.02
Elbow joint arthrosis, posttraumatic	716.12	M19.12
Elbow joint arthrosis, secondary	715.22	M19.22

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is positioned at 135 degrees of extension.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Locate the radial head by palpating over the lateral aspect of the elbow while supinating and pronating the wrist.
3. Find the depression immediately proximal to the radial head and mark it with ink.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

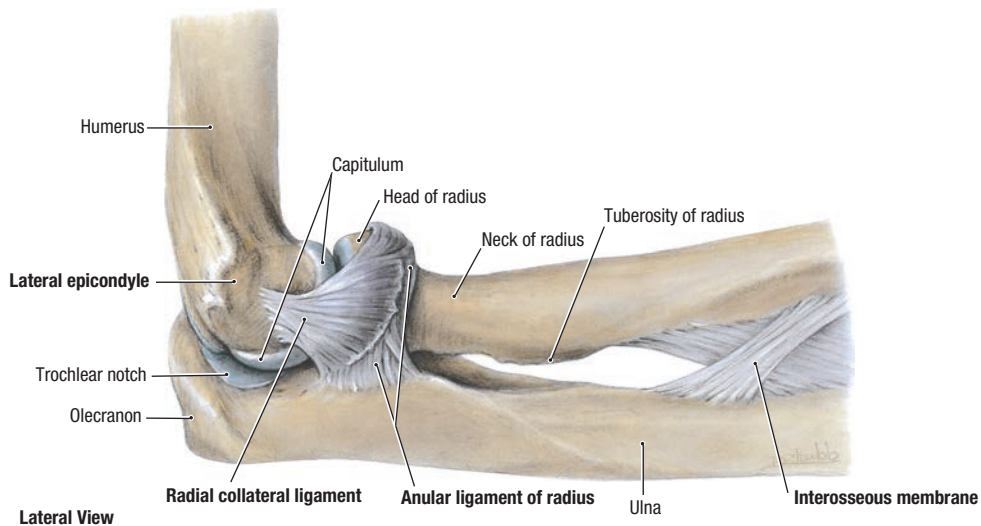


FIGURE 1 ● Right lateral elbow joint. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 10-mL syringe—for optional aspiration
- 25-gauge, 1 in. needle
- 20-gauge, 1 in. needle—for optional aspiration
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed medially toward the elbow joint.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the elbow joint. This places the needle tip between the humeral lateral condyle and the radial head.
6. If aspirating, withdraw fluid using a 20-gauge, 1 in. needle with the 10-mL syringe.
7. If injection of corticosteroid is to follow the aspiration, grasp the needle firmly, remove the 10-mL syringe from the 20-gauge needle, and then attach the 3-mL syringe filled with the steroid-lidocaine mixture.
8. If only injecting the steroid mixture, use a 25-gauge, 1 in. needle with the 3-mL syringe.
9. Inject the steroid solution as a bolus into the elbow joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.



FIGURE 2 ● Left elbow joint injection.

10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.
12. Instruct the patient to move his or her elbow through its full range of motion. This movement distributes the steroid solution throughout the elbow joint.
13. Reexamine the elbow in 5 min to confirm pain relief.

AFTERCARE

- Consider use of a neoprene elbow sleeve.
- Avoid vigorous use of the elbow over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

PEARLS

- The joint space at the radial head can be “opened up” by extending the elbow.
- Since the elbow has a narrow joint space, a 20-gauge needle is used for aspiration instead of the larger diameter, 18-gauge needle.
- If a fracture is suspected, do not inject corticosteroid.



A video clip showing an elbow joint injection can be found on the book's web site.

Olecranon Bursitis

Olecranon bursitis is a relatively common aspiration and injection site for primary care physicians. Successful aspiration is usually accomplished because the location of the bursa is readily evident. The subcutaneous olecranon bursa may become inflamed and accumulate fluid when subjected to repeated excessive pressure or friction. The fluid may consist of blood in acute trauma, thick proteinaceous mucoid fluid after repetitive injury, or purulent fluid if infected. Corticosteroids should never be administered if an infectious bursitis is suspected.

An 18-gauge needle is used to aspirate a large volume of fluid. Occasionally, the clinician may elect to inject a steroid solution if the fluid recollects—but only when an infection is excluded.

Indications	ICD-9 Code	ICD-10 Code
Olecranon bursitis	726.33	M70.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is maximally flexed.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. The point of maximal fluctuance is identified.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

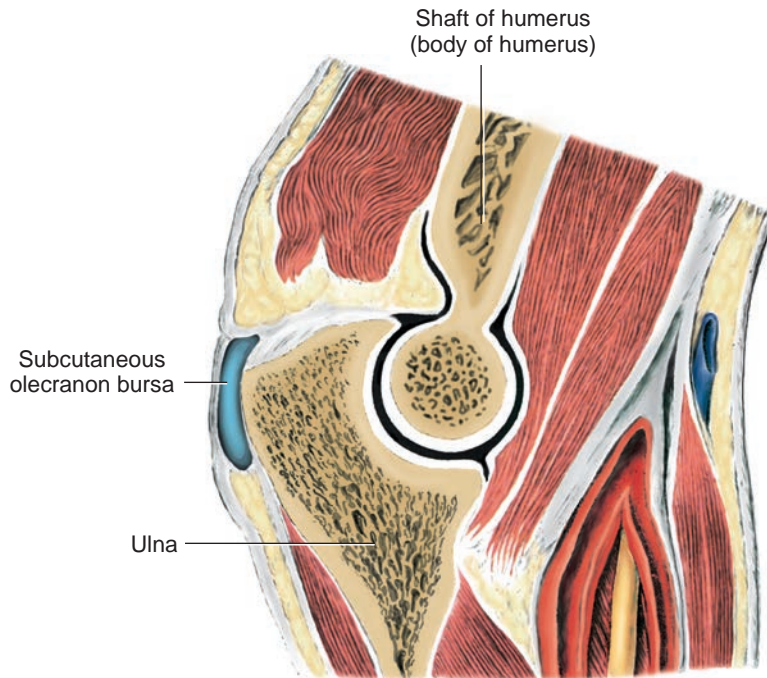


FIGURE 1 ● Left lateral elbow. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

EQUIPMENT

- 20-mL syringe—for aspiration
- 3-mL syringe—for optional injection
- 18-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine—for optional injection
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)—for optional injection
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the 18-gauge needle and syringe with the needle tip directed toward the area of maximal fluid collection.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the center of the bursa.
6. Aspiration should be easy accomplished. Use multiple syringes if the effusion is large (Fig. 3).
7. If injection following aspiration is elected, grasp the hub of the needle, remove the large syringe, and then attach the 3-mL syringe filled with the steroid solution.



FIGURE 2 ● Olecranon bursa aspiration.



FIGURE 3 ● Aspiration of hemorrhagic olecranon bursitis.

8. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following complete aspiration, and possible injection of corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage followed by a compressive elastic bandage.
11. Reexamine the elbow in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of elbow over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Aspiration and/or injection of intermediate bursa

PEARLS

- If the olecranon bursitis is due to an infection or acute hemorrhagic event, do not follow aspiration with corticosteroid injection.
- Injection of corticosteroid is usually reserved for recurrent bursitis.



A video clip showing an olecranon bursitis aspiration can be found on the book's web site.

Lateral Epicondylitis

Lateral epicondylitis is one of the most common soft tissue conditions treated by primary care providers. It usually is the result of an overuse injury to the origin of the wrist extensor and supinator muscle groups. Injection of corticosteroids for the treatment of lateral epicondylitis is one of the most common injections. A small diameter needle is appropriate as there will not be a fluid collection.

Indications

Lateral epicondylitis

ICD-9 Code

726.32

ICD-10 Code

M77.1

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is slightly flexed.
- The wrist is in a neutral-to-slightly pronated position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the point of maximal tenderness adjacent to the lateral epicondyle.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40mg of triamcinolone acetonide)
- One alcohol prep pad

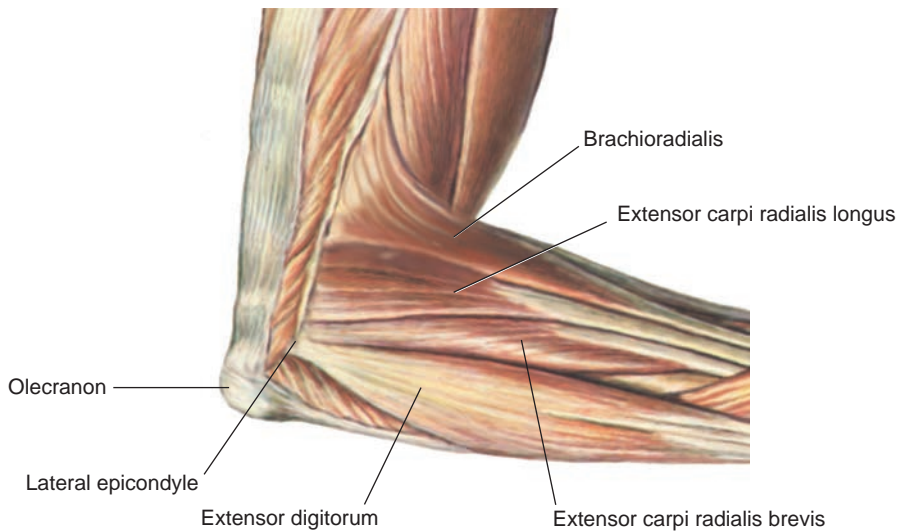


FIGURE 1 ● Right lateral forearm muscles. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed medially toward the lateral epicondyle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle to the bone of the lateral epicondyle.
6. Withdraw the needle 1 to 2 mm.
7. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her wrist and elbow through their full range of motion.
11. Reexamine the elbow in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive wrist extension and supination over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- Consider the use of a wrist brace to limit wrist extension.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of tendon origin or insertion



FIGURE 2 ● Left elbow lateral epicondylitis injection.



FIGURE 3 ● Pinch up the tissue to avoid subcutaneous deposition.

PEARLS

- Entrapment of branches of the radial nerve in the elbow and forearm can mimic the pain of lateral epicondylitis. Radial tunnel syndrome is most commonly caused by entrapment of the deep radial nerve as it enters the supinator muscle at the arcade of Frohse. Pain in this condition occurs about 4 cm distal and anterior to the lateral epicondyle.
- The lateral epicondylitis injection can be superficial—especially in thin persons. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. This particular injection is notorious for the development of this complication. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.

- In order to prevent this complication, one can use the pinch technique (Fig. 3). After insertion, gently grasp the skin on either side of the needle and push that up toward the syringe. This provides a greater distance between the skin and the actual injection site, thus minimizing the chance of developing atrophy and hypopigmentation.



A video clip showing a lateral epicondylitis injection can be found on the book's web site.

Medial Epicondylitis

Medial epicondylitis is a fairly common soft tissue condition encountered by primary care physicians. It usually is the result of an overuse injury to the origin of the wrist flexor and pronator muscle groups. A small diameter needle is appropriate as there will not be a fluid collection.

Indications	ICD-9 Code	ICD-10 Code
Medial epicondylitis	726.31	M77.0

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- Shoulder at 30 degrees of abduction and full external rotation.
- The affected elbow is flexed at 90 degrees.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the point of maximal tenderness adjacent to the medial epicondyle.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle

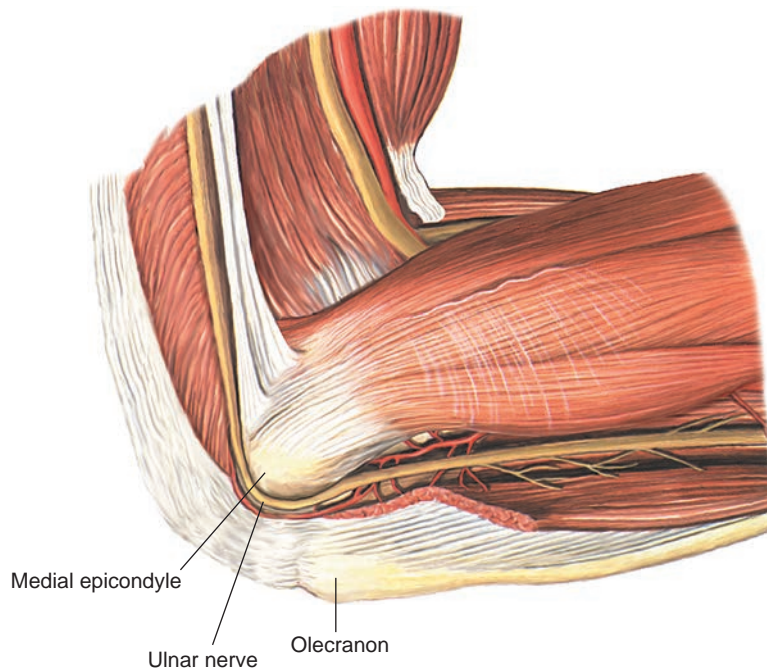


FIGURE 1 ● Left medial elbow. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed laterally toward the medial epicondyle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle to the bone of the medial epicondyle.
6. Withdraw the needle 1 to 2 mm.
7. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her wrist and elbow through their full range of motion.
11. Reexamine the elbow in 5 min to confirm pain relief.



FIGURE 2 ● Right elbow medial epicondylitis injection.

AFTERCARE

- Avoid excessive wrist flexion or pronation over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- Consider the use of a wrist brace to limit wrist flexion.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of tendon origin or insertion

PEARLS

- The ulnar nerve travels in close proximity to this injection. It courses just posterior and inferior to the medial epicondyle. On occasion, the local anesthetic spreading out from a properly placed injection may involve the ulnar nerve. The patient should be warned that transient numbness might occur in the lateral aspect of the hand as well as the ring and little fingers.



A video clip showing a medial epicondylitis injection can be found on the book's web site.

Radial Nerve Entrapment

Patients uncommonly present to the primary care office for treatment of radial nerve entrapment in the forearm. This syndrome is caused by entrapment of the deep branch of the radial nerve (posterior interosseous nerve) as it enters the supinator muscle at the arcade of Frohse. Compression or scarring of the posterior interosseous nerve may cause denervation of extensor/supinator muscles and numbness or paresthesias in the distribution of the radial sensory nerve. The result can be pain, weakness, and dysfunction. Pain in this condition occurs about 4 cm distal to the lateral epicondyle. A nerve block utilizing local anesthetic and corticosteroid injection may be attempted, but successful treatment often requires surgical release.

Indications	ICD-9 Code	ICD-10 Code
Radial nerve entrapment syndrome	354.2	G56.3

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is slightly flexed.
- The wrist is in a neutral to slightly pronated position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected forearm.
2. Identify the lateral epicondyle.
3. The point of maximal tenderness is usually located about 4 cm distal and anterior to the lateral epicondyle.
4. Identify and mark the point of maximal tenderness.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the elbow.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

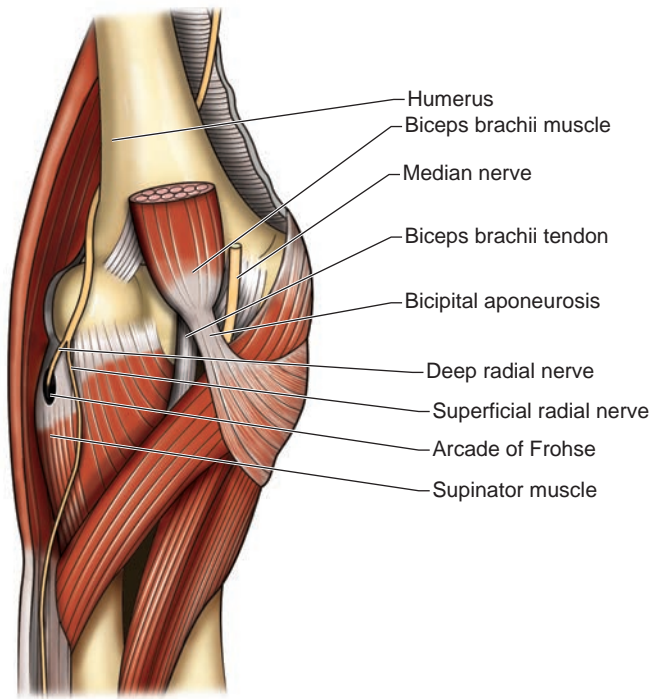


FIGURE 1 ● Anterior aspect of right elbow.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Slowly advance the needle until the needle tip is at the anticipated injection site at the radial nerve.
6. If any pain, paresthesias, or numbness is encountered, withdraw the needle slightly.
7. When the needle is placed along the radial nerve, slowly deposit the steroid solution as a bolus around that structure.



FIGURE 2 ● Radial nerve entrapment injection.

8. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Instruct the patient to move his or her wrist and elbow through their full range of motion.
12. Reexamine the proximal forearm in 5 min to confirm pain relief and the development of numbness in the distribution of the radial nerve from the local anesthetic.

AFTERCARE

- Avoid excessive wrist extension and supination over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

PEARLS

- Entrapment of branches of the radial nerve in the elbow and forearm can mimic the pain of lateral epicondylitis.



A video clip showing a radial nerve entrapment injection can be found on the book's web site.

Carpal Tunnel Syndrome—Proximal Approach

Carpal tunnel syndrome is a very common condition encountered in primary care. It represents a compressive injury to the median nerve as it traverses the carpal tunnel in the wrist. This usually occurs as a result of an overuse injury following repetitive handgrip movements or compression of the contents of the carpal tunnel from various disease processes. Predisposing factors may include previous injury, pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, or amyloidosis. Corticosteroid injection of the carpal tunnel is an effective but underutilized treatment option by primary care providers.

The specific injection technique used in this text was described by Dammers et al. in 1999¹. Other approaches can be used, but they do not have the literature demonstrating the efficacy and safety as this approach. The study referenced is a randomized, double-blind, placebo-controlled trial. Following a single 40 mg methylprednisolone injection, there was 77% improvement at 1 month. It was still effective in 50% of patients at 1 year versus 7% of controls. A second injection resulted in further improvement. The investigators reported no side effects.

Indications	ICD-9 Code	ICD-10 Code
Carpal tunnel syndrome	354.0	G56.0

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated at an angle of 30 degrees.
- The elbow is slightly flexed with the wrist in supination.
- The wrist is then positioned in slight hyperextension with the placement of chucks pads or towels underneath the supinated wrist.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the distal palmar crease as shown (Fig. 3).

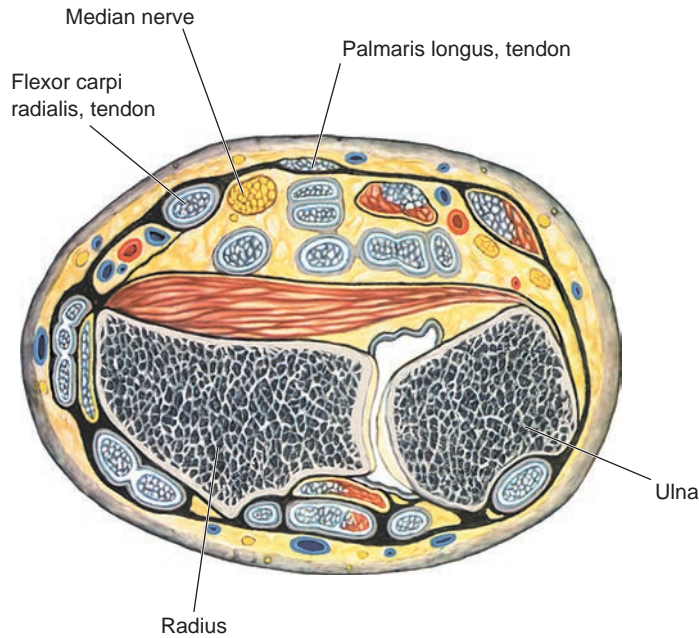


FIGURE 1 ● Right wrist cross-section at the level of the distal radioulnar joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

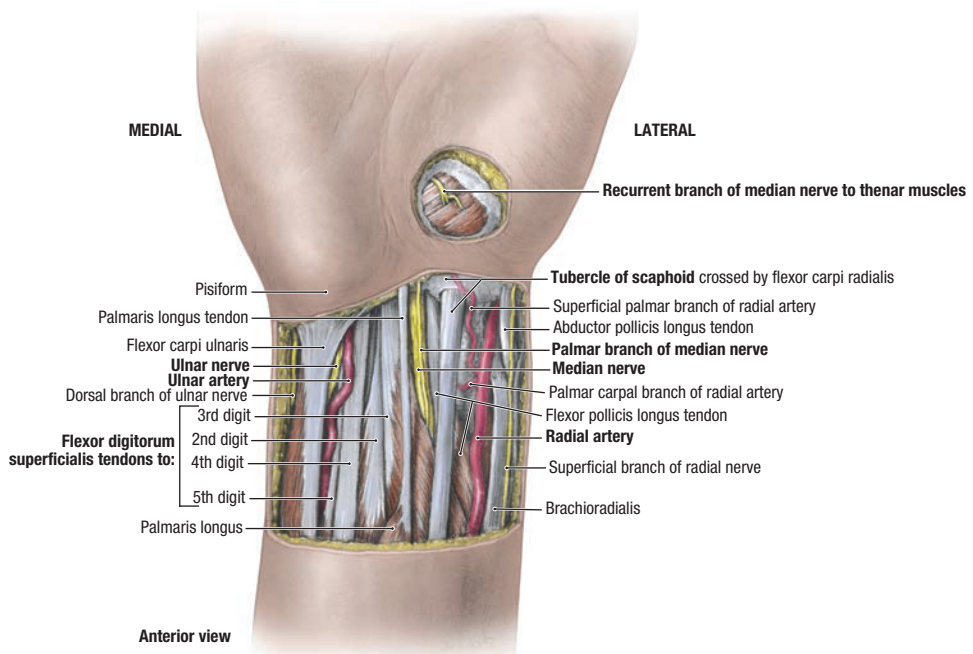


FIGURE 2 ● Right wrist—volar aspect. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

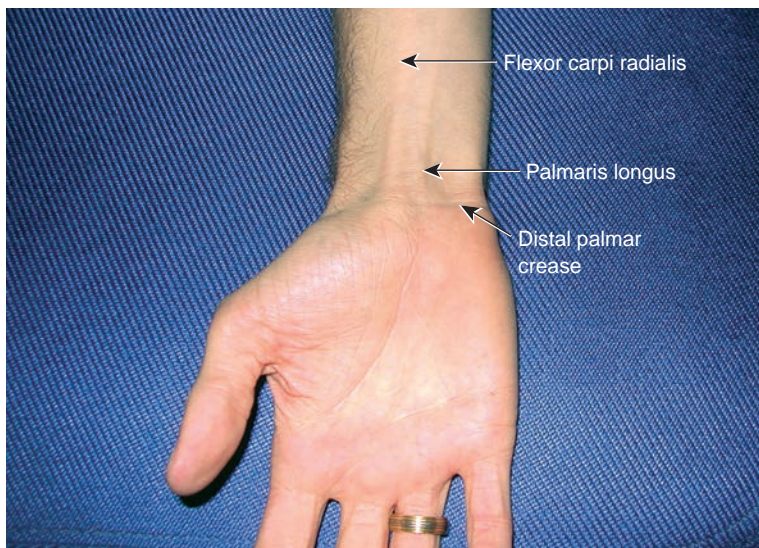


FIGURE 3 ● Right carpal tunnel surface anatomy.

3. Identify and mark the course of the palmaris longus and flexor carpi radialis tendons.
4. Mark a point 4 cm (1.5 in.) proximal to the distal palmar crease and between the tendons. This is the entry point for the needle.
5. Mark a spot at the intersection of the distal palmar crease between the palmaris longus and flexor carpi radialis tendons. This is the target site.
6. At both the entry point and target site, press firmly on the skin with the retracted tip of a ballpoint pen.
7. After the landmarks are identified, the patient should not move the wrist.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 10 to 20 degrees angle to the skin with the needle tip directed distally.



FIGURE 4 ● Right carpal tunnel injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
5. Very slowly advance the needle toward the wrist, keeping the needle between the palmaris longus and flexor carpi radialis tendons.
6. If any pain, paresthesias, or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. When the needle has been fully inserted, slowly deposit the steroid solution as a bolus around the median nerve.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Reexamine the hand in 5 min to confirm pain relief or the development of numbness in the distribution of the median nerve from the local anesthetic.

AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use a carpal tunnel wrist brace while sleeping to avoid wrist flexion and extension.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20526—Injection of carpal tunnel

PEARLS

- The approach illustrated here is easy to perform and has few side effects.
- Steroid injections into the carpal tunnel may damage the median nerve.
- Warn the patients that the median nerve may be contacted when using this approach. Ask them to calmly report any pain or electrical shock sensation without jerking their arm away. If this occurs, simply withdraw the needle a few millimeters before continuing to advance the needle using a slightly different path medially or laterally.

- Since the injection is made just proximal to the carpal tunnel, the overlying flexor retinaculum will not be pierced with the needle.

REFERENCE

1. Dammers JW, Veering MM, Vermeulen M. Injection with methylprednisolone proximal to the carpal tunnel: Randomised double blind trial. *Br Med J*. 1999;319:884–886.



A video clip showing a carpal tunnel injection using the proximal approach can be found on the book's web site.

Carpal Tunnel Syndrome—Traditional Approach

Carpal tunnel syndrome is a very common condition encountered in primary care. It represents a compressive injury to the median nerve as it traverses the carpal tunnel in the wrist. This usually occurs as a result of an overuse injury following repetitive handgrip movements or compression of the contents of the carpal tunnel from various disease processes. Predisposing factors may include previous injury, pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, or amyloidosis. Corticosteroid injection of the carpal tunnel is an effective but underutilized treatment option by primary care providers. This injection technique is the most commonly performed injection of the carpal tunnel. Although it is straightforward to perform, there is a higher risk for direct needle injury to the median nerve compared to an injection performed proximal to the carpal tunnel.

Indications	ICD-9 Code	ICD-10 Code
Carpal tunnel syndrome	354.0	G56.0

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is slightly flexed with the wrist in supination.
- The wrist is then positioned in slight hyperextension with the placement of chucks pads or towels underneath the supinated wrist.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the distal palmar crease as shown (Fig. 3).
3. Identify and mark the intersection of the palmaris longus tendon with the distal palmar crease.
4. Mark a spot 1 cm proximal and 1 cm ulnar to this intersection.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the wrist.

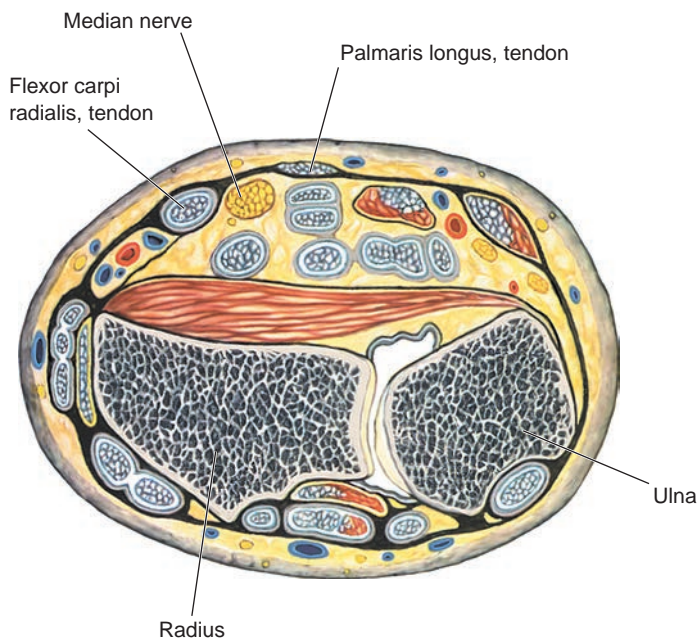


FIGURE 1 ● Right wrist cross-section at the level of the distal radioulnar joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

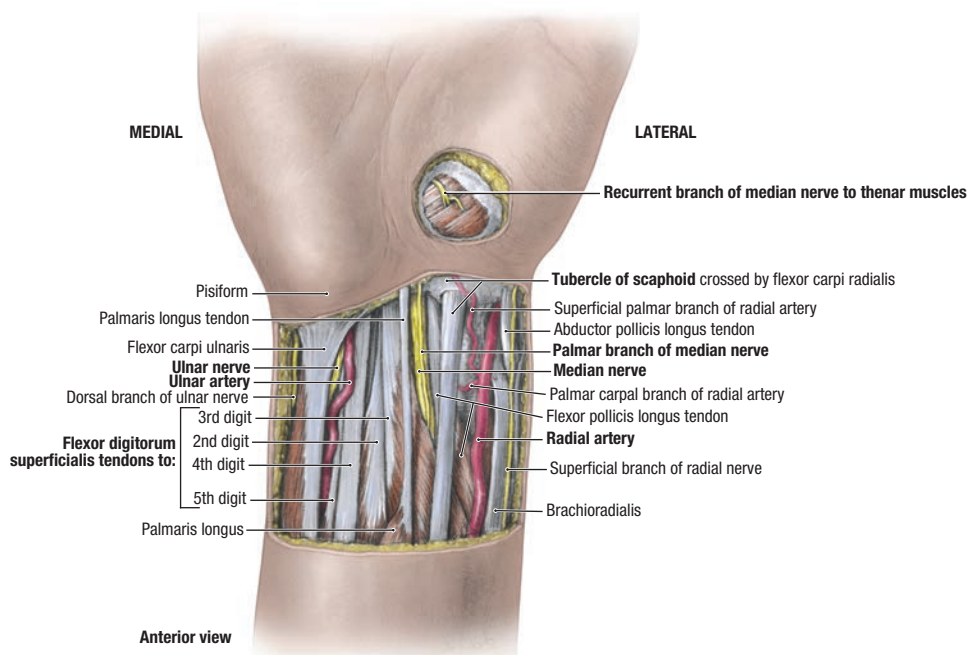


FIGURE 2 ● Right wrist—volar aspect. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

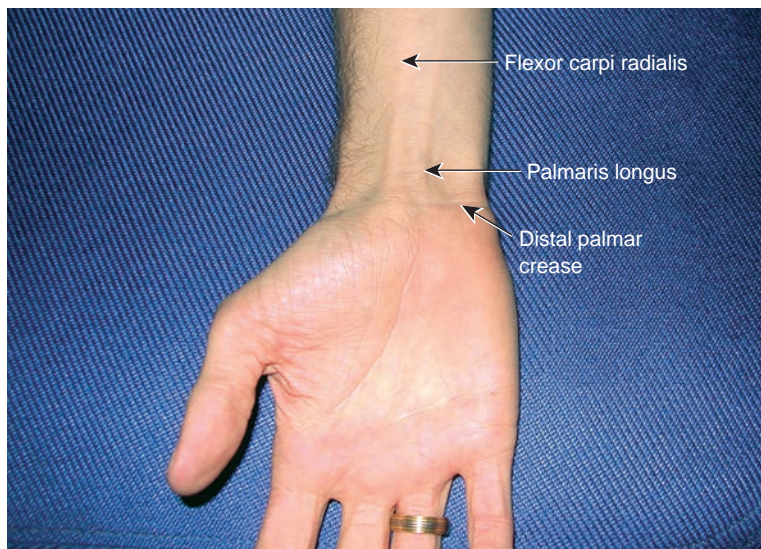


FIGURE 3 ● Right carpal tunnel surface anatomy.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 45 degree angle to the skin of the wrist with the needle tip directed toward the base of the thumb.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
5. Slowly advance the needle toward the base of the thumb, until the needle tip is approximately 1 cm deep into the intersection of the palmaris longus and the distal palmar crease.
6. If any pain, paresthasias, or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. Slowly deposit the steroid solution as a bolus around the median nerve.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.



FIGURE 4 ● Carpal tunnel injection—traditional approach.

10. Apply a sterile adhesive bandage.
11. Reexamine the hand in 5 min to confirm pain relief or the development of numbness in the distribution of the median nerve from the local anesthetic.

AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use a carpal tunnel wrist brace while sleeping to avoid wrist flexion and extension.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20526—Injection of carpal tunnel

PEARLS

- The approach illustrated here is easy to perform and has few side effects.
- However, the possibility of direct needle injury to the median nerve is greater with the traditional technique because the nerve is “fixed” in position by the carpal tunnel.
- Warn the patients that the median nerve may be contacted when using this approach. Ask them to report any pain or electrical shock sensation. If this occurs, simply withdraw the needle a few millimeters before continuing to advance the needle using a slightly different path medially or laterally.



A video clip showing a carpal tunnel injection can be found on the book's web site.

Wrist Joint

Injection of the wrist joint is a relatively uncommon procedure in primary care. Pain and swelling in the wrist may be the result of trauma, osteoarthritis, an infectious etiology, or an inflammatory disorder such as rheumatoid arthritis. Occasionally, there will be a small collection of synovial fluid to remove. In the absence of a fluid collection, a small diameter needle is used for corticosteroid injection.

Indications	ICD-9 Code	ICD-10 Code
Wrist pain	719.43	M25.53
Wrist sprain of unspecified site	842.00	S63.5
Wrist joint arthritis, unspecified	716.93	M13.93
Wrist joint arthrosis, primary	715.13	M19.03
Wrist joint arthrosis, posttraumatic	716.13	M19.13
Wrist joint arthrosis, secondary	715.23	M19.23

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is slightly flexed with neutral positioning of the wrist in pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the area of maximal tenderness and/or swelling over the dorsal aspect of the wrist joint.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the wrist.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 10-mL syringe—for optional aspiration

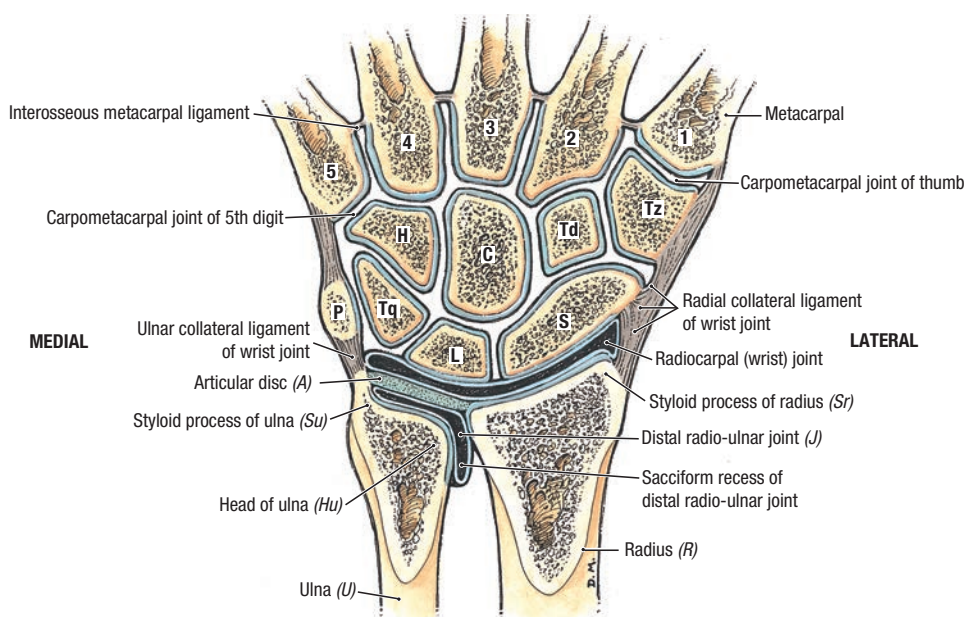


FIGURE 1 ● Coronal section of the wrist. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

- 25-gauge, 1 in. needle—for injection
- 20-gauge, 1 in. needle—for optional aspiration
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle down into the wrist joint.
6. If aspirating, withdraw the fluid using a 20-gauge, 1 in. needle with the 10-mL syringe and then inject through the same syringe.
7. If only injecting, use a 25-gauge, 1 in. needle with the 3-mL syringe.
8. If injection following aspiration is elected, remove the large syringe from the 20-gauge needle and then attach the 3-mL syringe filled with the steroid solution.
9. Inject the steroid solution as a bolus into the wrist joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.



FIGURE 2 ● Right dorsal wrist joint injection.

12. Instruct the patient to move his or her wrist through its full range of motion. This movement distributes the steroid solution throughout the joint.
13. Reexamine the wrist in 5 min to confirm pain relief.

AFTERCARE

- Consider the use of a wrist brace.
- Avoid excessive use of the wrist over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

PEARLS

- There are many septae that create multiple partitions within the wrist joint complex. Successful administration of corticosteroid involves pinpoint precision and may require multiple injections during the same office visit.
- Work on the dorsal aspect of the wrist. The volar aspect contains the radial artery, median nerve, and ulnar artery. These must all be avoided.
- If multiple injections are performed, do not give more than 1 mL (40 mg of triamcinolone) of the steroid solution to the patient at any single office visit.



A video clip showing a wrist joint injection can be found on the book's web site.

de Quervain's Tenosynovitis

Injection of corticosteroids for the treatment of de Quervain's tenosynovitis is a fairly common procedure for primary care physicians. This condition represents a stenosing tenosynovitis of the radial aspect of the wrist. The extensor pollicis brevis and abductor pollicis longus tendons run alongside each other and share a common tendon sheath. Overuse movements that require repetitive extension and abduction of the thumb generally cause this condition. However, there may be an underlying inflammatory disorder present.

Indications

de Quervain's tenosynovitis

ICD-9 Code

727.04

ICD-10 Code

M65.4

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position. The thumb is directed superiorly midway between supination and pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify tenderness located in the tendon sheath that contains the abductor pollicis longus and the extensor pollicis brevis.
3. The injection point is located directly between these two tendons. Mark this spot.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the wrist or thumb.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

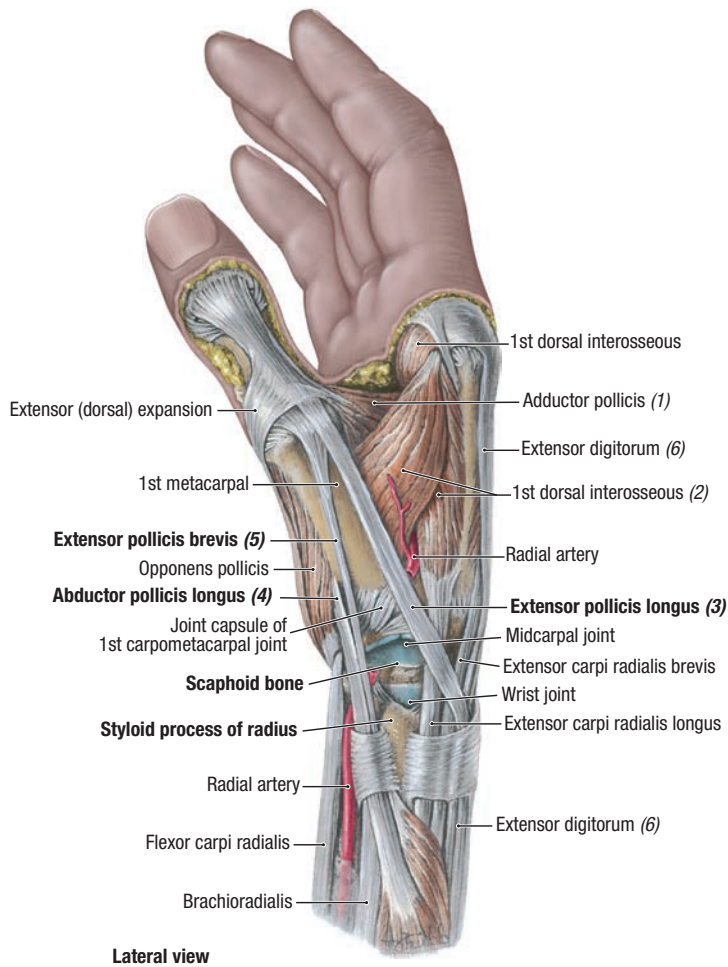


FIGURE 1 ● Right hand anatomy. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 45 degree angle to the skin with the needle tip directed proximally.



FIGURE 2 ● de Quervain's tenosynovitis injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the convergence of the abductor pollicis longus and the extensor pollicis brevis tendons until the needle tip is located between the tendons in the tendon sheath.
6. Slowly inject the steroid solution as a bolus into the tendon sheath. A small bulge in the shape of a sausage should develop in the tendon sheath.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her thumb through its full range of motion. This movement distributes the steroid solution throughout the tenosynovial sheath.
10. Reexamine the hand and wrist in 5 min to confirm pain relief.

AFTERCARE

- Ensure no excessive wrist flexion or pronation over the next 2 weeks by the application of a wrist thumb spica splint.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of single tendon sheath

PEARLS

- The de Quervain's tenosynovitis injection is superficial—especially in thin persons. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. de Quervain's injection is notorious for the development of this complication. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.



A video clip showing a de Quervain's injection can be found on the book's web site.

Ganglion Cyst

Aspiration and possibly corticosteroid injection of wrist ganglion cysts are common procedures for primary care physicians. Ganglions are cysts containing clear mucinous fluid. They may originate from the wrist joint or tendon sheaths. A common site of occurrence is along the extensor carpi radialis brevis as it passes over the dorsum of the wrist joint. Although most commonly found in the wrist, ganglion cysts may also occur in other joints. Ganglion cysts located over the dorsal surface of the wrist joint are commonly treated with aspiration and rarely treated with corticosteroid injections. Those cysts involving the volar surface of the wrist are best managed with surgical referral.

Indications	ICD-9 Code	ICD-10 Code
Ganglion cyst of joint	727.41	M67.4
Ganglion cyst of tendon sheath	727.42	M67.4

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- For ganglion cysts over the dorsal aspect, the wrist is held in pronation and slight flexion.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify the cystic structure over the dorsal aspect of the wrist joint.
3. The injection point is located directly over the cyst.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the wrist.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 5-mL syringe
- 3-mL syringe—for optional injection

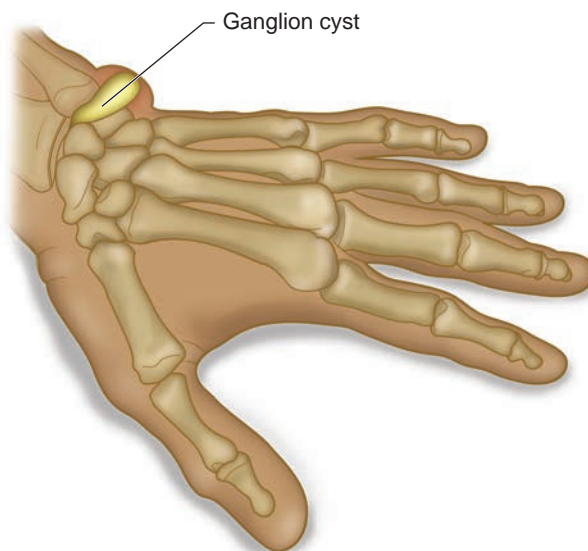


FIGURE 1 ● Dorsal wrist ganglion cyst.

- 18-gauge, 1-1/2 in. needle
- 0.25 mL of 1% lidocaine without epinephrine—for optional injection
- 0.25 mL of the steroid solution (10 mg of triamcinolone acetonide)—for optional injection
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle quickly but carefully into the cyst.
6. Apply suction with the syringe and withdraw the expected small amount of a clear gel (Fig. 3).
7. With gloved fingers, apply firm pressure to the tissues surrounding the punctured cyst. Remove all extruded clear gel with sterile gauze pads (Fig. 4).
8. If injection following aspiration is elected, do not remove the needle. Rather, remove the large syringe from the 18-gauge needle and then attach the 3-mL syringe filled with the steroid solution. In this case, do not attempt to extrude the ganglion fluid after the procedure.
9. If indicated, slowly inject the steroid solution into the ganglion cyst.
10. Following aspiration and/or injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.



FIGURE 2 ● Right wrist dorsal ganglion cyst aspiration.



FIGURE 3 ● Multiple ganglion cysts.

AFTERCARE

- Consider immobilizing the wrist with a splint for 2 weeks.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of ganglion cyst

- CPT 2009 gives specific instructions when reporting multiple ganglion cyst aspirations/injections. In this case, the code 20612 is used and the modifier -59 appended.



FIGURE 4 ● Mashing of a ganglion cyst.

PEARLS

- Use extreme caution when treating ganglion cysts over the volar aspect of the wrist. These commonly involve the area immediately next to the radial artery. An accidental injury of this artery with a 18-gauge needle can have disastrous results.
- Initial treatment of a symptomatic ganglion cyst usually requires only cyst aspiration with manual extrusion of remaining contents.
- Treatment of recurrent cysts may require the injection of a small amount of a corticosteroid.
- Even with proficient technique, ganglion cysts frequently recur and may require surgical referral for definitive management.



A video clip showing a ganglion cyst injection can be found on the book's web site.

Thumb Carpometacarpal Joint

The carpometacarpal (CMC) joint of the thumb is a relatively common injection site for most primary care physicians. This joint articulates the trapezium and the 1st metacarpal bone of the thumb. It is the most common site of osteoarthritis in the hand.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the CMC joint. There is no joint effusion to remove.

Indications	ICD-9 Code	ICD-10 Code
Pain of thumb CMC joint	719.44	M25.54
CMC joint arthropathy, unspecified	716.94	M18.9
CMC joint arthrosis, primary	715.14	M18.0
CMC joint arthrosis, posttraumatic	716.14	M18.3
CMC joint arthrosis, secondary	715.24	M18.5

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position between supination and pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected hand.
2. Locate the CMC joint by palpating the thumb metacarpal bone in a distal-to-proximal direction. At the proximal aspect of the first metacarpal, there will be tenderness as the examiner's finger passes over, then drops into the CMC joint. This is located between the first metacarpal and the trapezium bone. The patient will report tenderness in this joint.
3. Mark the injection point directly over the CMC joint.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hand or thumb.

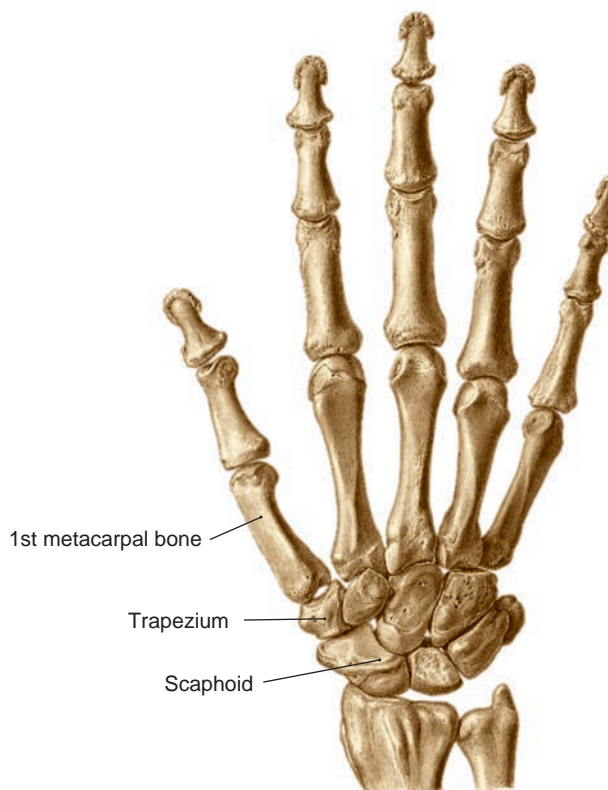


FIGURE 1 ● Dorsal aspect of the right hand. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly toward the first CMC joint.



FIGURE 2 ● Left hand, first CMC joint injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle down into the joint.
6. Inject the steroid solution as a bolus into the joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her thumb through its full range of motion. This movement distributes the steroid solution throughout the CMC joint.
10. Reexamine the CMC joint in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the thumb over the next 2 weeks.
- Consider the use of a thumb spica splint.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20600—Injection of small joint

PEARLS

- Applying traction to the thumb in a distal direction as shown in the photo will help open up the joint to accommodate the needle.



A video clip of thumb CMC joint injection can be found on the book's web site.

Metacarpophalangeal Joint

Metacarpophalangeal (MCP) joints of the hand are uncommon injection sites for most primary care clinicians. An MCP joint may become inflamed with osteoarthritis, inflammatory arthritis, or septic arthritis.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the MCP joint. There should not be a significant joint effusion to remove in the absence of infection.

Indications	ICD-9 Code	ICD-10 Code
Pain of MCP joint	719.44	M25.54
Sprain of MCP joint	842.12	S63.6
MCP joint arthritis, unspecified	716.94	M13.94
MCP joint arthrosis, primary	715.14	M19.04
MCP joint arthrosis, post-traumatic	716.14	M19.14
MCP joint arthrosis, secondary	715.24	M19.24

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position. The wrist is pronated and the patient is asked to make a loose fist.
- The hand is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands anterior to the affected hand.
2. Locate the affected MCP joint.
3. The point of entry is located directly over the MCP joint, just radial or ulnar to the extensor tendon.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hand or fingers.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

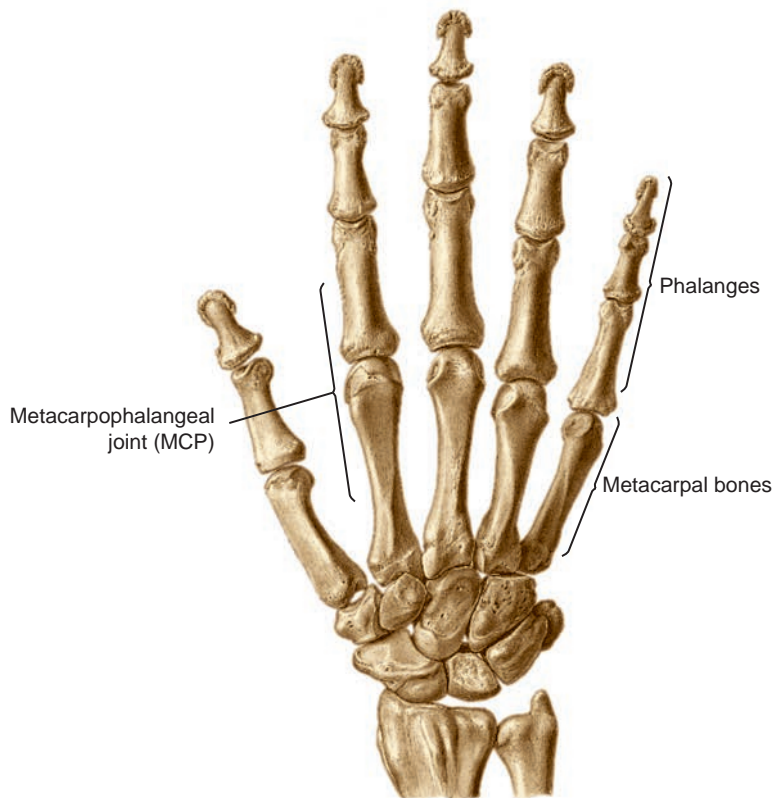


FIGURE 1 ● Dorsal aspect of the right hand. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly toward the first MCP joint.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle down into the joint.



FIGURE 2 ● Metacarpophalangeal joint injection.

6. Inject the steroid solution as a bolus into the joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her MCP joint through its full range of motion. This movement distributes the steroid solution throughout the joint.
10. Reexamine the MCP joint in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the affected hand and finger over the next 2 weeks.
- Consider the use of a volar wrist splint.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20600—Injection of small joint

PEARLS

- Approach the MCP joint dorsally, but avoid inserting the needle through the extensor tendon.
- Avoid the development of a subdermal wheal during injection. This indicates the deposition of steroid solution that may cause localized skin atrophy and hypopigmentation.

Trigger Finger

Stenosing tenosynovitis, or trigger finger, is the term given for tendinosis of the flexor tendons of the digits. This tendonopathy with nodule formation usually occurs as a result of repetitive compression injury. It is more common in patients with diabetes and rheumatoid arthritis. In this disorder, the nodule forms where the flexor tendon passes over the metacarpal head of a finger or, less commonly, the CMC joint of the thumb. With flexion of the digit, the nodule passes over the proximal edge of the first annular (A-1) pulley of the tendon sheath and becomes entrapped. This is a fairly common procedure performed by primary care providers. A discrete injection of corticosteroid at the nodule offers an effective nonsurgical treatment of this condition.

Indications	ICD-9 Code	ICD-10 Code
Trigger finger	727.03	M65.3

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position.
- The wrist is fully supinated.
- The hand is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands anterior to the affected hand.
2. Identify and mark the tender nodule located in the finger's flexor tendon and its sheath. This should be located over the metatarsal heads.
3. Mark a point 1 cm distal to the nodule.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hand or the fingers.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

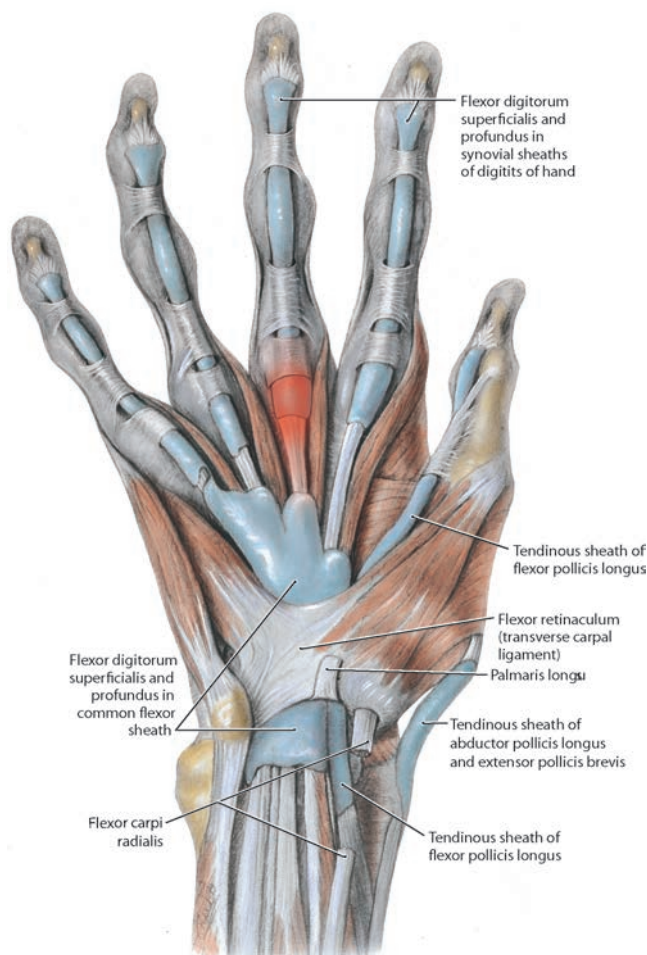


FIGURE 1 ● Tendinous (synovial) sheaths of long flexor tendons of the digits. An inflamed nodule is shown in the flexor tendon of the long finger. (Adapted from Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 45 degree angle to the skin with the needle tip directed proximally.



FIGURE 2 ● Trigger finger injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until the needle tip is located at the tendon nodule. Back up the needle 1 to 2 mm.
6. Slowly inject the steroid solution around the nodule into the tendon sheath. A subtle bulge in the shape of a sausage may develop in the tendon sheath.
7. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her finger through its full range of motion. This movement distributes the steroid solution throughout the tenosynovial sheath.
11. Reexamine the hand in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive repetitive handgrip activities over the next 2 weeks.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of single tendon sheath

PEARLS

- The flexor tendon nodule may be approached from either a distal or a proximal direction. It however is easier to perform this injection in a distal-to-proximal direction.



A video clip showing a trigger finger injection can be found on the book's web site.

Muscular Trigger Points

Patients present frequently to primary care physicians with muscular trigger points. Trigger points are focal areas of muscular ischemia, spasm, and inflammation that can occur anywhere, but usually involve the back muscles. They occur most commonly in patients with fibromyalgia/fibrositis. Although the administration of local corticosteroid preparation is common, “dry needling” of the lesions or injection of anesthetic alone has also shown efficacy.

Indications	ICD-9 Code	ICD-10 Code
Fibromyalgia/Fibromyositis	729.1	M79.7
Myalgia/Myositis	729.1	M79.1
Spinal enthesopathy	720.1	M46.0
Cervicalgia	723.1	M54.2
Rheumatism unspecified	729.0	M79.0
Tension headache	307.81	G44.2

PATIENT POSITION

- Lying prone on the examination table.

LANDMARKS

1. With the patient lying prone on the examination table, the clinician stands lateral to the affected muscular trigger point(s).
2. Identify tender nodules that are usually located in the rhomboid or trapezius muscles.
3. The injection point is located directly over the nodule(s).
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads

- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. With the nondominant hand, firmly press on either side of the nodule with the index and long fingers in order to “fix” the position of the muscular nodule.
4. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the trigger point.
5. Using the no-touch technique, introduce the needle at the insertion site (Fig. 1).
6. Advance the needle carefully into the nodule until the needle tip is located in the center of the trigger point.
7. Inject the steroid solution as a bolus slowly into the nodule. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Use the fanning technique to inject the nodule(s) in multiple locations.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Massage each of the injection sites to distribute the steroid solution throughout the trigger point(s).
12. Reexamine the area of involvement in 5 min to confirm pain relief.

AFTERCARE

- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Treatment of the underlying condition.
- Consider follow-up examination in 2 weeks.

CPT codes

20552—Injection of trigger point(s) in one to two muscle groups

20553—Injection of trigger point(s) in three + muscle groups.



FIGURE 1 ● Muscular trigger point injection.

These codes are used only once each session, regardless of the number of injections performed.

PEARLS

- If the nodule or area of tenderness is large, use the fanning technique to inject in multiple locations.
- Avoid injecting the nodule so deeply so as to risk pneumothorax.



A video clip showing a muscular trigger point injection can be found on the book's web site.

Suprascapular Neuritis

Patients uncommonly present to the primary care office for evaluation of suprascapular neuritis. It is an underdiagnosed disorder that is the result of an entrapment neuropathy. The suprascapular nerve is vulnerable as it passes through the suprascapular notch and again at the spinoglenoid notch. Entrapment at the former leads to weakness of the supraspinatus and infraspinatus muscles as well as vague posterior unilateral shoulder pain that is described as a deep, dull, aching discomfort that is exacerbated with overhead throwing motions. Entrapment at the latter causes weakness of the infraspinatus muscle and is generally painless. Definitive treatment is surgical decompression, but a nerve block at the suprascapular notch can be used to manage this condition as well as perioperative shoulder pain.

Indications

Neuritis, unspecified

ICD-9 Code

729.2

ICD-10 Code

M79.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Sitting on an exam stool, with arms resting on the exam table and neck in a neutral position.

LANDMARKS

1. With the patient sitting on an exam stool, the clinician stands posterior to the affected scapula.
2. Find the midpoint between the tip of the acromion and the medial aspect of the spine of the scapula and mark it with an ink pen.
3. Find the coracoid process and mark it with an ink pen.
4. Draw a line between these two points and mark the midposition of this line.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle

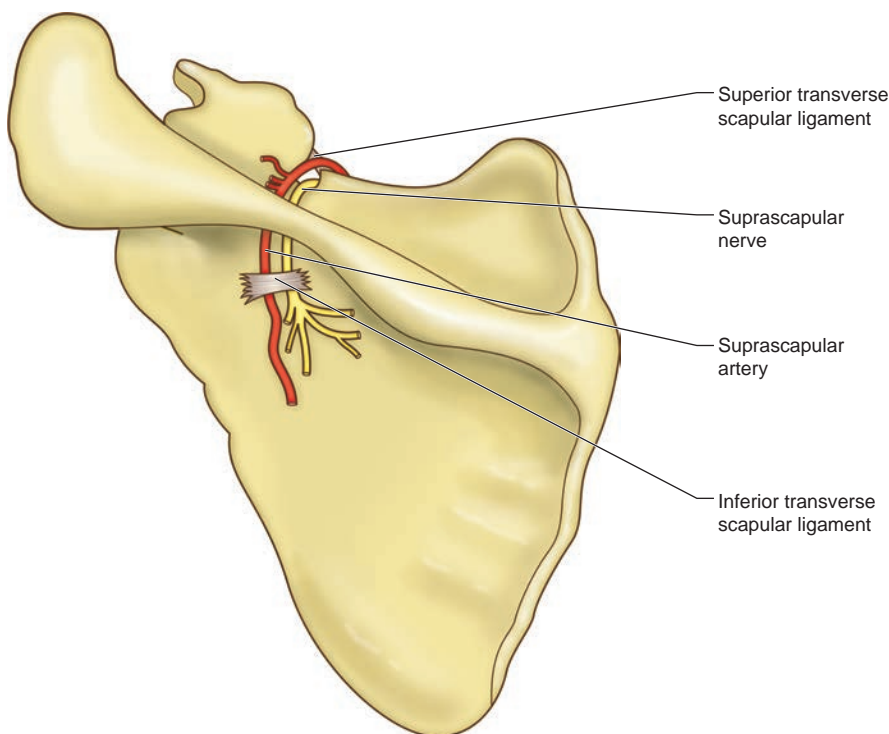


FIGURE 1 ● Nerves and vessels of posterior scapular region (left).

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile, adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the suprascapular notch.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle completely through the supraspinatus muscle and touch the bone of the suprascapular fossa. Back up the needle 1 to 2 mm.
6. Aspirate to make sure that the needle tip is not in the suprascapular artery. If there is no blood return, then inject the steroid solution as a bolus into the muscle around the suprascapular nerve. The injected solution should flow smoothly into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.



FIGURE 2 ● Suprascapular neuritis injection.

9. Instruct the patient to move his or her shoulder through its full range of motion in external rotation and abduction. This movement distributes the steroid solution throughout the suprascapular fossa.
10. Reexamine the shoulder and scapula in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive abduction, external rotation, and overhead throwing motions of the shoulder over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

PEARLS

- Always aspirate before injecting to make sure that the needle tip is not in the suprascapular artery.
- If there is no significant improvement in pain or weakness and the diagnosis has been confirmed by EMG, then refer the patient for surgical decompression of the superior or inferior transverse scapular ligaments.



A video clip showing a suprascapular neuritis injection can be found on the book's web site.

Scapulothoracic Syndrome

Scapulothoracic syndrome is a relatively uncommon problem. It usually affects middle-aged persons whose occupations require them to extend their arms for prolonged periods of time. This can also occur as a complication from preexisting shoulder lesions or in disabled patients who are unable to control the scapulothoracic relationship. The abnormal positioning causes a bursitis because of abnormal biomechanics of the scapula and the underlying posterior chest wall. Scapulothoracic syndrome is characterized by pain that may be localized to the medial superior border of the scapula or may radiate to the neck and shoulder. Treatment includes activity modification, physical therapy, NSAIDs, and injection of corticosteroids in the region of the medial superior scapular border.

Indications	ICD-9 Code	ICD-10 Code
Bursitis of shoulder	727.3	M75.5
Specified injury to scapula	719.48	S49.8
Unspecified injury to scapula	959.2	S49.9
Other specified arthropathy of scapula	716.81	M19.81
Unspecified arthropathy of scapula	716.91	M19.91

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Sitting erect on an exam stool, with ipsilateral hand on the contralateral shoulder.

LANDMARKS

1. With the patient seated on the exam stool, the clinician stands or sits behind the affected scapula.
2. Palpate to determine the area of most intense pain. This is usually along the medial superior scapular border of the scapula. Mark this site with an ink pen.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

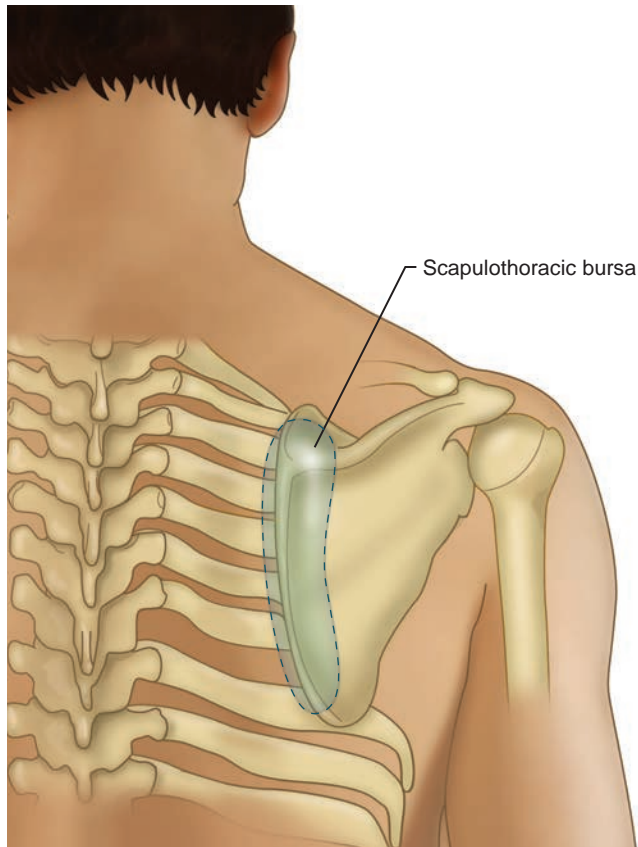


FIGURE 1 ● Bursitis of the shoulder.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 20-degree angle to the skin with the tip of the needle directed toward the area of tenderness in the scapulothoracic space.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the point of maximal tenderness in a plane parallel to the undersurface of the scapula, not toward the chest wall.
6. Inject half of the steroid solution as a bolus at the point of maximal tenderness and the rest in the scapulothoracic space. The injected solution should flow smoothly



FIGURE 2 ● Scapulothoracic injection.

into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.

7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the area.
10. Reexamine the scapula in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive abduction, reaching in front, pushing, pulling, and overhead throwing motions of the shoulder over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Injection of major joint or bursa

PEARLS

- Avoid injecting the area so deeply so as to risk pneumothorax.



A video clip showing a scapulothoracic injection can be found on the book's web site.

Sacroiliac Joint

Inflammation of the sacroiliac joints is a common condition seen by primary care physicians. Sacroiliitis may be caused by acute or repetitive traumata, spondyloarthropathies, degenerative arthritis, pregnancy, and rarely by an infection of the joint. The sacroiliac joint is a large joint that is easily identified, but can be challenging to access without imaging to guide the injection.

Indications	ICD-9 Code	ICD-10 Code
SI pain	724.6	M25.55
SI sprain	846.1	S33.6
Sacroiliitis	720.2	M46.1
SI joint arthritis—unspecified	716.95	M13.9
SI joint osteoarthritis—primary	715.95	M19.9

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Standing up with back in 30 degrees of forward flexion and hands/arms supported by the examination table.

LANDMARKS

- With the patient standing up with back in forward flexion, the clinician stands directly behind the patient.
- Identify tenderness over the sacroiliac joint. Mark it with ink.
- At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 10-mL syringe
- 25-gauge, 1-1/2 or 3-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 8 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

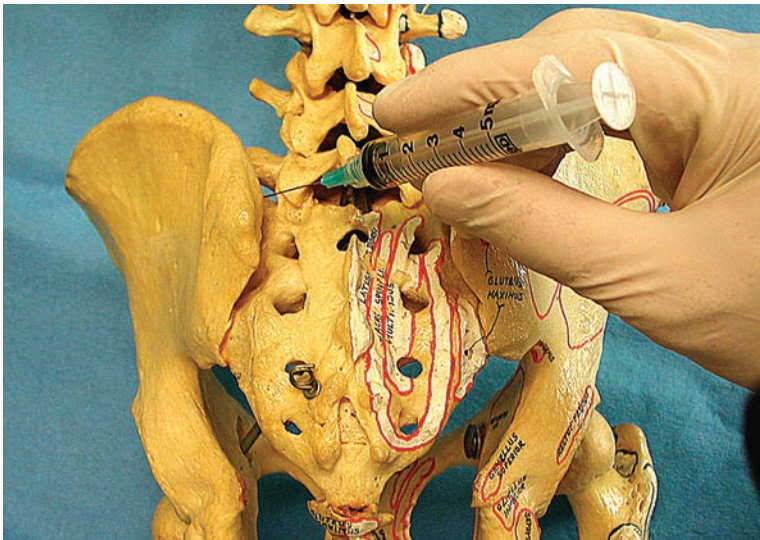


FIGURE 1 ● Sacroiliac anatomy—note the angle of insertion.

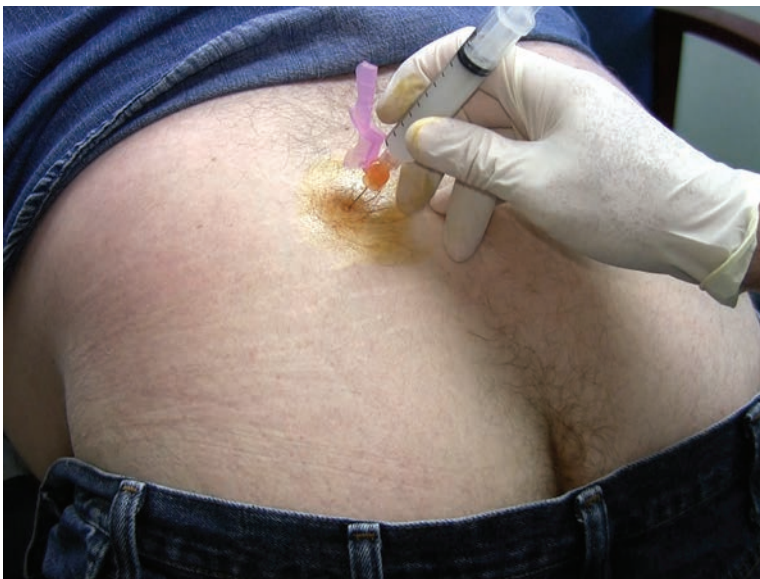


FIGURE 2 ● Sacroiliac joint injection.

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle at a 30-degree angle laterally, relative to the sagittal plane, and 15 degrees inferiorly, relative to the transverse plane, with the tip of the needle directed toward the sacroiliac joint.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle slowly and carefully into the SI joint.
6. Inject the steroid solution as a bolus into the sacroiliac joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.

7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Reexamine the sacroiliac joint in 5 min to confirm pain relief.

AFTERCARE

- NSAIDs, ice, and/or physical therapy as indicated.
- Treatment of the underlying condition.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Arthrocentesis, aspiration, and/or injection of major joint or bursa

PEARLS

- The successful placement of this injection may need ultrasound or fluoroscopic guidance.



A video clip showing a sacroiliac joint injection can be found on the book's web site.

Hip Joint—Anterior Approach

Hip joint pain from arthritis or capsulitis is a common condition seen in primary care medical practice. This often occurs as a result of osteoarthritis, posttraumatic arthritis, and rheumatoid arthritis. Patients typically represent the middle-aged and older population. Septic arthritis in children is fortunately now a rare occurrence since the development of the *Haemophilus influenzae* and pneumococcal vaccines. Because of the joint's perceived inaccessibility, fear of vascular puncture, and the remote risk of avascular necrosis of the head of the femur, primary care physicians rarely perform aspiration and corticosteroid injections of the hip joint. In fact, access to this joint is straightforward. Furthermore, the success of this injection is significantly increased with the use of ultrasound imaging.

Indications	ICD-9 Code	ICD-10 Code
Hip pain	719.45	M25.55
Hip capsulitis	726.5	M16.1
Hip arthritis, unspecified	716.95	M13.95
Hip arthrosis, primary	715.15	M19.05
Hip arthrosis, posttraumatic	716.15	M19.15
Hip arthrosis, secondary	715.25	M19.25

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the head of the bed slightly elevated.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected hip.
2. Find the inguinal ligament and then palpate the femoral artery 3 cm distal to it. From that point, move 3 cm laterally and mark that spot which is directly over the hip joint.
3. (Optional) Use ultrasound to image the hip joint.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hip.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

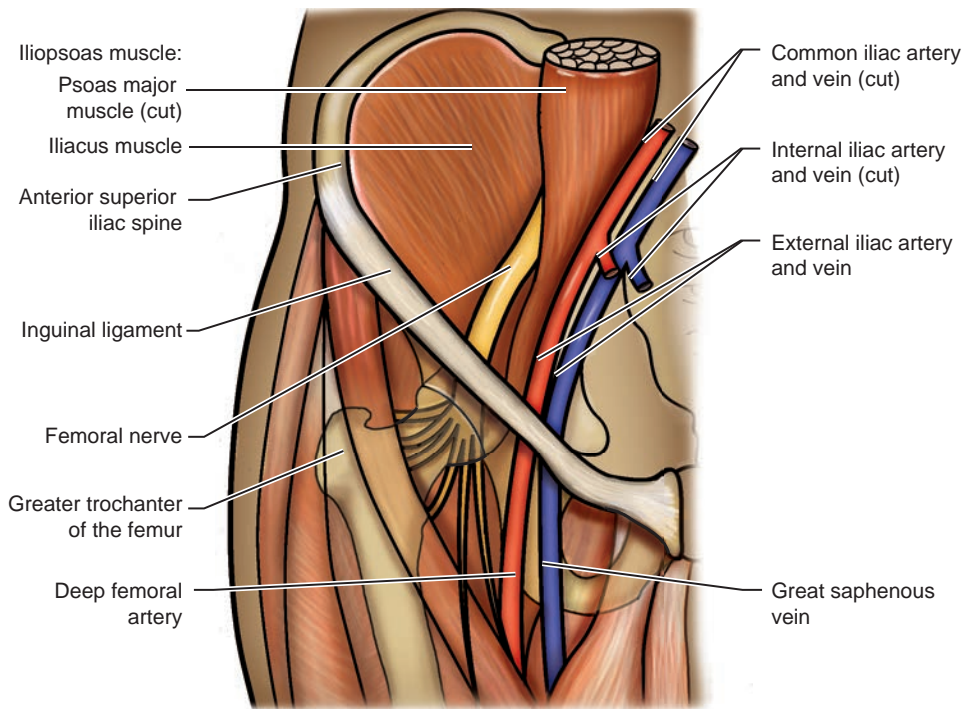


FIGURE 1 ● Right anterior hip and femoral triangle.

EQUIPMENT

- 20-mL syringe—for aspiration
- 3-mL syringe—for the injection of corticosteroid/local anesthetic mixture
- 25-gauge, 1-1/2 in. needle in thin individuals. Otherwise, use a 25-gauge, 3-1/2 in. needle (for injections only)
- 20-gauge, 1-1/2 in. needle in thin individuals. Otherwise, use a 20-gauge, 3-1/2 in. needle (for aspirations and injections)
- 8 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. (Optional) Use an ultrasound to image the hip joint using an adjacent, but separate acoustic window (Figs. 2 and 3). This allows imaging separate from the injection site so that there is no contamination from the ultrasound gel. Alternatively, the entire site may be prepped in an aseptic manner and sterile ultrasound gel utilized.
2. Prep the insertion site with alcohol followed by the povidone-iodine pads.
3. Achieve good local anesthesia by using topical vapocoolant spray.
4. Position the needle and syringe perpendicular to the skin with the tip of the needle directed posteriorly toward the hip joint.



FIGURE 2 ● Right hip ultrasound to determine the needle placement.

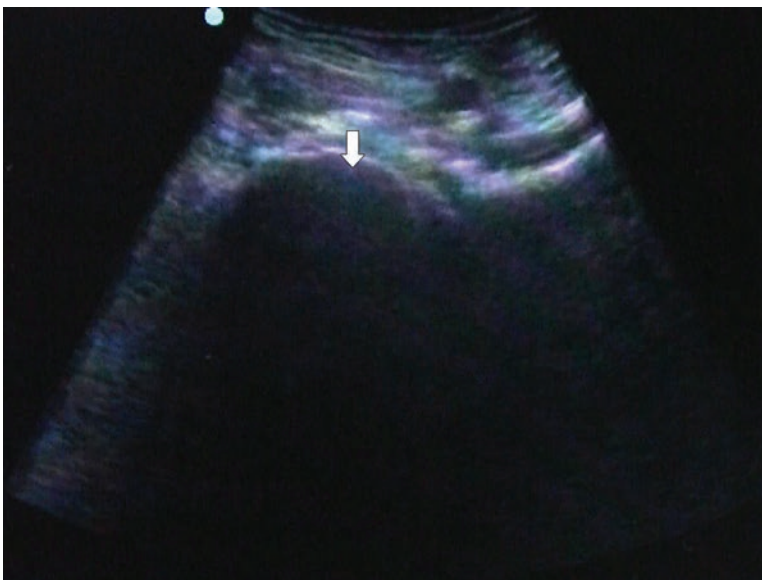


FIGURE 3 ● Right hip ultrasound. Note the cortex of the head of the femur (indicated by arrow).

5. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
6. Advance the needle toward the hip joint until the needle tip contacts the femoral head. Back up the needle 1 to 2 mm.
7. Inject the steroid solution as a bolus into the hip joint capsule. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.



FIGURE 4 ● Hip joint injection—anterior approach.

10. Instruct the patient to move his or her hip through its full range of motion. This movement distributes the steroid solution throughout the hip joint capsule.
11. Reexamine the hip in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive weight bearing and hip movement over the next 2 weeks.
- NSAIDs and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Arthrocentesis, aspiration, and/or injection of the major joint or bursa

PEARLS

- In large individuals, ultrasound or X-ray fluoroscopic guidance of the spinal needle may be necessary.



A video clip showing a hip joint injection can be found on the book's web site.

Hip Joint—Lateral Approach

Hip joint pain from arthritis or capsulitis is a common condition seen in primary care medical practice. This often occurs as a result of osteoarthritis, posttraumatic arthritis, and rheumatoid arthritis. Patients typically represent the middle-aged and older population. Septic arthritis in children is fortunately now a rare occurrence since the development of the *Haemophilus influenzae* and pneumococcal vaccines. Because of the joint's perceived inaccessibility, fear of vascular puncture, and the remote risk of avascular necrosis of the head of the femur, primary care physicians rarely perform aspiration and corticosteroid injections of the hip joint. In fact, access to this joint is straightforward. Furthermore, the success of this injection is significantly increased with the use of ultrasound imaging.

Indications	ICD-9 Code	ICD-10 Code
Hip pain	719.45	M25.55
Hip capsulitis	726.5	M16.1
Hip arthritis, unspecified	716.95	M13.95
Hip arthrosis, primary	715.15	M19.05
Hip arthrosis, posttraumatic	716.15	M19.15
Hip arthrosis, secondary	715.25	M19.25

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying on the examination table in the lateral decubitus position on the unaffected hip.

LANDMARKS

1. With the patient lying on the examination table in the lateral decubitus position on the unaffected hip, the clinician stands posterior to the affected hip.
2. Identify the trochanter of the femur.
3. Mark a point 2 cm above the proximal aspect of the femoral trochanter.
4. (Optional) Use ultrasound to image the hip joint.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the hip.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

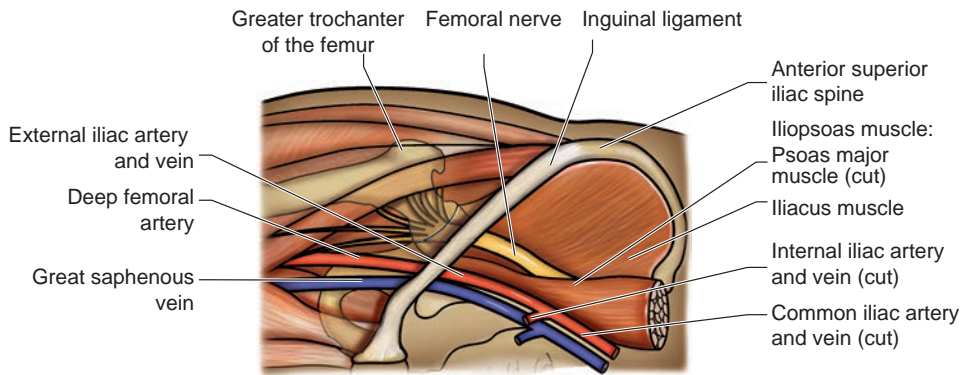


FIGURE 1 ● Right anterior hip and femoral triangle.

EQUIPMENT

- 20-mL syringe—for aspiration
- 3-mL syringe—for the injection of corticosteroid/local anesthetic mixture
- 25-gauge, 1-1/2 in. needle in thin individuals. Otherwise, use a 25-gauge, 3-1/2 in. needle (for injections only)
- 20-gauge, 1-1/2 in. needle in thin individuals. Otherwise, use a 20-gauge, 3-1/2 in. needle (for aspirations and injections)
- 8 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. (Optional) Use an ultrasound to image the hip joint using an adjacent, but separate acoustic window. This allows imaging separate from the injection site so that there is no contamination from the ultrasound gel. Alternatively, the entire site may be prepped in an aseptic manner and sterile ultrasound gel utilized.
2. Prep the insertion site with alcohol followed by the povidone-iodine pads.
3. Achieve good local anesthesia by using topical vapocoolant spray.
4. Position the needle and syringe perpendicular to the skin with the tip of the needle directed medially toward the hip joint.
5. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
6. Advance the needle toward the hip joint until the needle tip contacts the femoral head. Back up the needle 1 to 2 mm.
7. Inject the steroid solution as a bolus into the hip joint capsule. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her hip through its full range of motion. This movement distributes the steroid solution throughout the hip joint capsule.
11. Reexamine the hip in 5 min to confirm pain relief.



FIGURE 2 ● Hip joint injection—lateral approach.

AFTERCARE

- Avoid excessive weight bearing and hip movement over the next 2 weeks.
- NSAIDs and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Arthrocentesis, aspiration, and/or injection of the major joint or bursa

PEARLS

- In large individuals, ultrasound or X-ray fluoroscopic guidance of the spinal needle may be necessary.

Piriformis Syndrome

Patients uncommonly present to the primary care office for the evaluation of piriformis syndrome. This is an often overlooked disorder that occurs when abnormal tightness of the piriformis muscle compresses the sciatic nerve. It may occur following trauma, vigorous physical activity, developmental abnormalities, cerebral palsy, or after total hip arthroplasty. The diagnosis may be made by excluding other causes of sciatica, palpating an abnormally tight and tender piriformis muscle, and the demonstration of a positive figure four test. Treatment consists of physical therapy as well as optional injections of corticosteroid or botulinum toxin.

Indications

Injury to the sciatic nerve at thigh/hip

ICD-9 Code

956.0

ICD-10 Code

S74.0

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Standing up with the back in forward flexion and hands/arms supported by the examination table.
- Alternatively, this injection may be performed with the patient lying in the lateral decubitus position on the examination table.

LANDMARKS

1. With the patient standing up with the back in forward flexion and hands/arms supported by the examination table, the clinician stands directly behind the patient.
2. Locate the S2 median sacral crest and the lateral aspect of the femoral trochanter.
3. Identify the point of maximal tenderness over the piriformis muscle. This will be one third to one half of the distance from the sacral crest.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move.

ANESTHESIA

- Local anesthesia of the skin with a topical vapocoolant spray may be used, but it is not necessary in most patients.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle

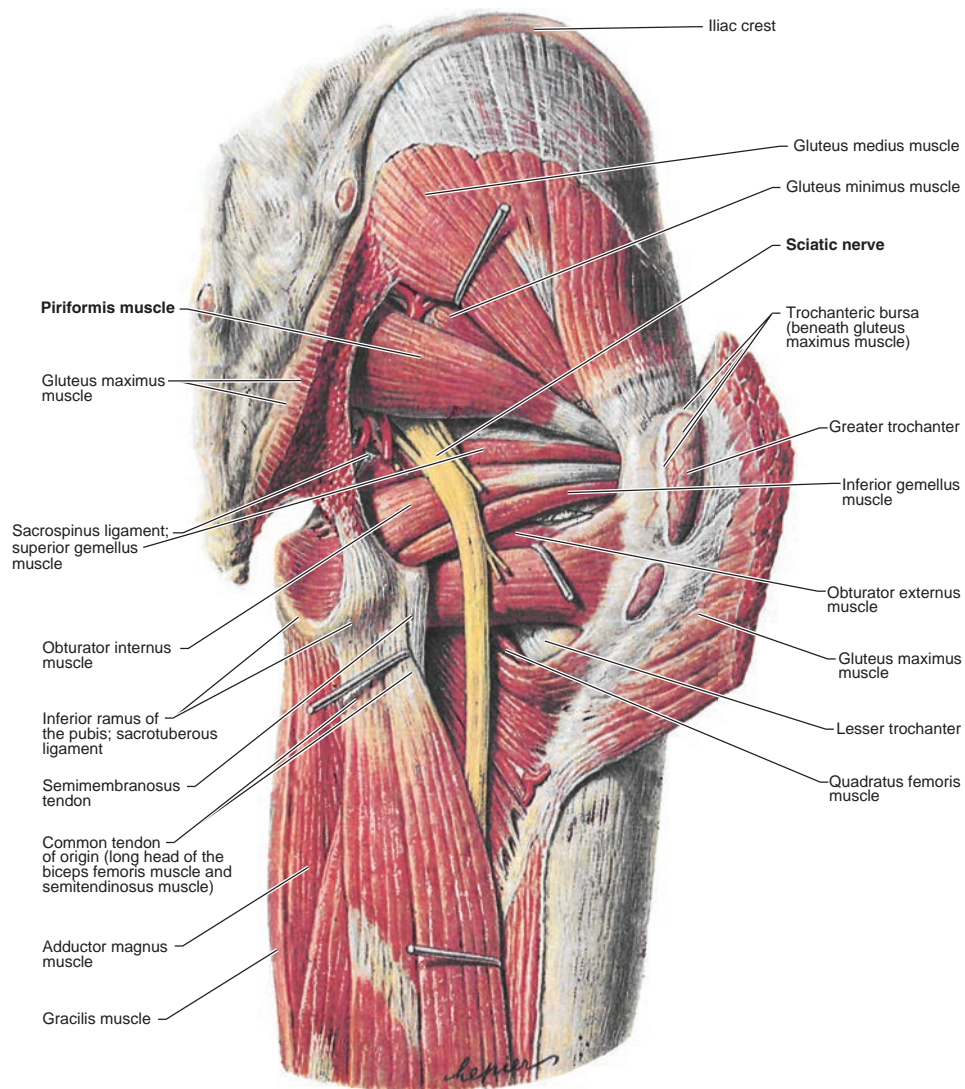


FIGURE 1 ● Middle and deep gluteal muscles and sciatic nerve. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using a topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed anteriorly.

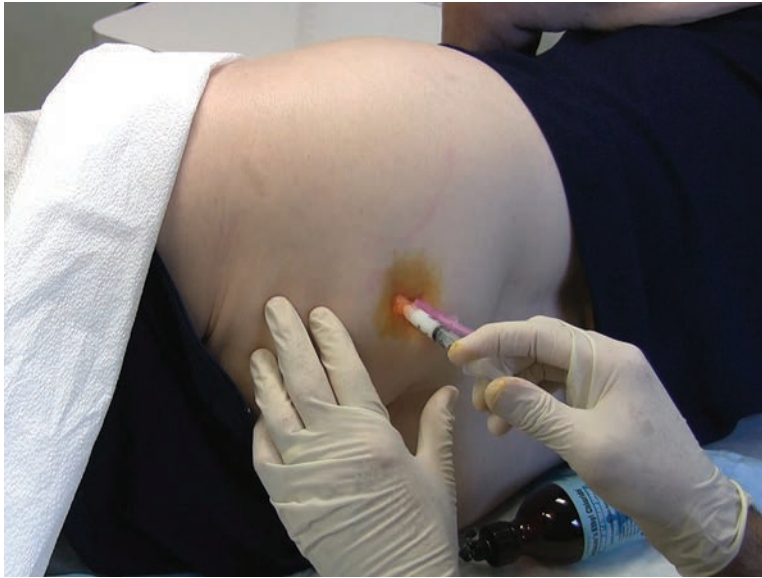


FIGURE 2 ● Piriformis injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until you feel that there is an increase in resistance in the muscle due to spasm and/or fibrosis. If the patient experiences sudden shooting pain down the leg, the sciatic nerve has been contacted. Withdraw the needle a few millimeter until there is no pain.
6. Aspirate to ensure no blood return and inject the volume of the syringe into the soft tissues. The injected solution should flow smoothly. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her hip through its full range of motion. This movement distributes the steroid solution throughout the course of the piriformis muscle.
10. Reexamine the piriformis muscle in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the affected hip over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20552—Injection of trigger point(s) in one to two muscle groups



A video clip showing a piriformis injection can be found on the book's web site.

Meralgia Paresthetica

Patients occasionally present to their primary care provider with burning pain, numbness, or paresthesias over the lateral aspect of the thigh. Meralgia paresthetica is most commonly caused by a compression neuropathy of the lateral femoral cutaneous nerve of the thigh as it passes through a tunnel formed by the lateral attachment of the inguinal ligament and the anterior superior iliac spine. It is more common in patients with diabetes. Percussion of the nerve over this tunnel just anterior to the anterior iliac spine or extending the thigh posteriorly may reproduce or worsen the symptoms. Treatment is directed at relieving the compression and usually consists of wearing looser clothing or losing weight. A corticosteroid injection at the site of compression often helps relieve the symptoms.

Indications

Neuritis, unspecified

ICD-9 Code

729.2

ICD-10 Code

M79.2

Relevant Anatomy: (Figs. 1 and 2)

PATIENT POSITION

- Lying supine on the examination table.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected hip.
2. Find the anterior superior iliac spine and the pubic bone.
3. Firmly palpate the inguinal ligament that connects these two structures.
4. The lateral femoral cutaneous nerve of the thigh traverses the inguinal ligament about 2 cm inferior and medial to the anterior superior iliac spine under the inguinal ligament. Tap over this area or press firmly until discomfort is elicited. Mark that spot with ink.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the hip or leg.

ANESTHESIA

- Local anesthesia of the skin with a topical vapocoolant spray may be used, but it is not necessary in most patients.

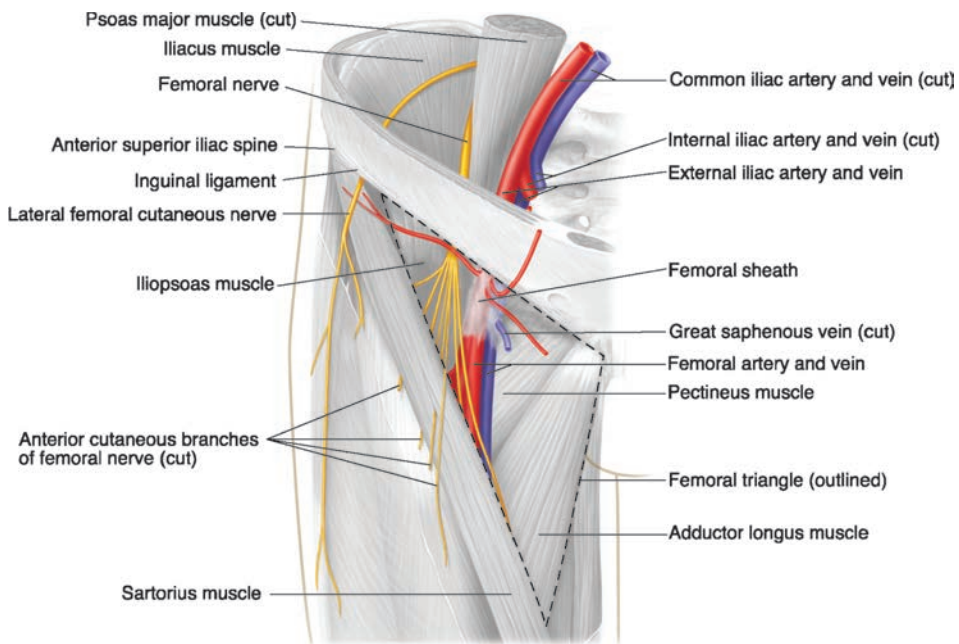


FIGURE 1 ● Anterior right hip neurovascular structures. (Adapted from Tank PW, Gest TR. *Lippincott Williams & Wilkins Atlas of Anatomy*. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

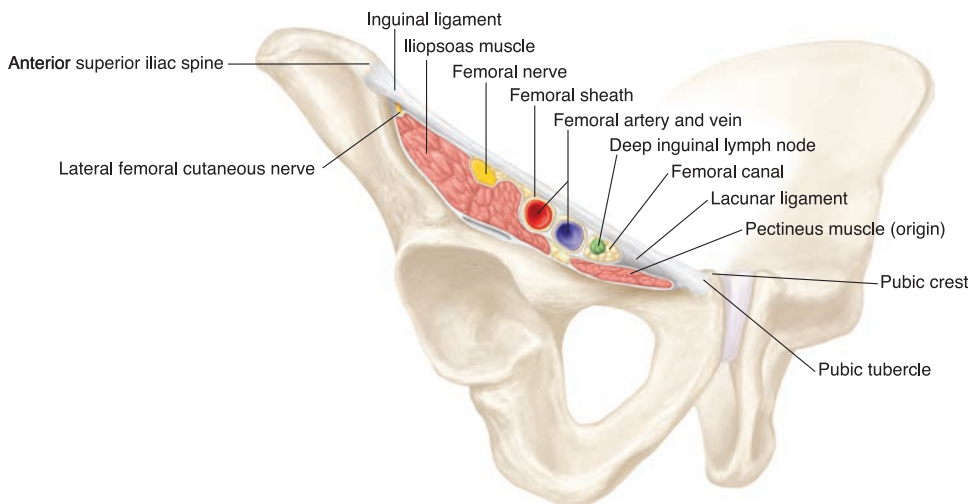


FIGURE 2 ● Section through the femoral sheath. (Adapted from Tank PW, Gest TR. *Lippincott Williams & Wilkins Atlas of Anatomy*. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage



FIGURE 3 ● Meralgia paresthetica injection.

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using a topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 3).
5. Advance the needle 2 to 3 cm until the needle tip is located under the inguinal ligament.
6. Inject the steroid solution as a bolus into the space. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her hip through its full range of motion. This movement distributes the steroid solution throughout the area.

AFTERCARE

- Treatment is directed at relieving the compression and usually consists of wearing looser clothing or losing weight.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

Trochanteric Bursitis

Injection of corticosteroids for the treatment of trochanteric bursitis is a common procedure for primary care physicians. This condition is an overuse injury caused by repeated friction of the insertion of the gluteus maximus as it passes over the femoral trochanter. This may occur following repeated stair climbing, walking up an incline, or prolonged pressure over the trochanter.

A small diameter needle is appropriate as there will not be a fluid collection.

Indications	ICD-9 Code	ICD-10 Code
Trochanteric bursitis	726.5	M70.6

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying on the examination table in the lateral decubitus position on the unaffected hip.

LANDMARKS

1. With the patient lying on the examination table in the lateral decubitus position on the unaffected hip, the clinician stands behind the patient.
2. Identify and mark the point of maximal tenderness over the trochanteric bursa.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the hip.

ANESTHESIA

- Local anesthesia of the skin with topical vapocoolant spray may be used, but is not necessary in most patients.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad

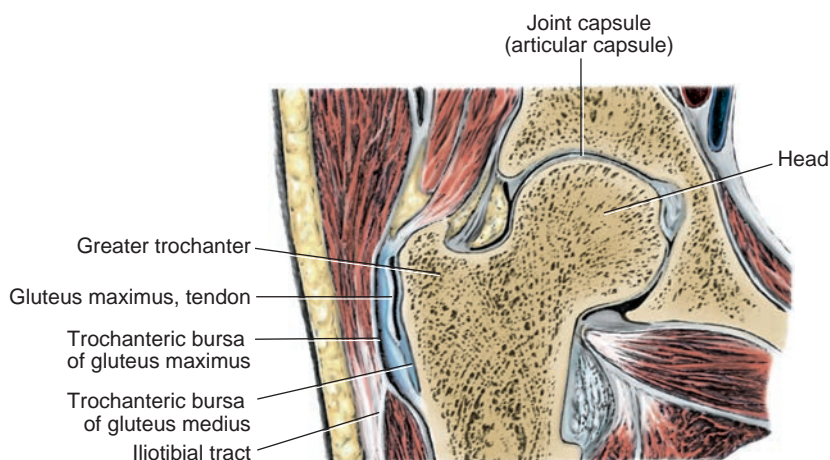


FIGURE 1 ● Right anterior hip joint. (Adapted from Agur A, Lee MJ. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:336.)

- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed medially.
4. Using the no-touch technique, introduce the needle at the insertion site.
5. Advance the needle toward the femoral trochanter until the needle tip touches the bone. Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus steadily in the area of the trochanteric bursa. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to massage the area and move his or her hip through its full range of motion. This movement distributes the steroid solution throughout the trochanteric bursa.
10. Reexamine the area of the trochanteric bursa in 5 min to confirm pain relief (Fig. 2).

AFTERCARE

- Avoid excessive hip movement over the next 2 weeks.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of tendon origin or insertion



FIGURE 2 ● Trochanteric bursitis injection.

PEARLS

- Consider fanning this injection to disperse the corticosteroid solution over a wider area.



A video clip showing a trochanteric bursitis injection can be found on the book's web site.

Hip Adductor Tendonitis

Patients occasionally present to the primary care office for the evaluation and treatment of pain upon adduction of the hip. The pectineus, adductor longus, magnus, and medius muscles connect the medial aspect of the femur to the pubic bone. Acute injury or chronic overuse may cause tendonitis or tendonopathy of the hip adductors. The adductor longus is most commonly injured, and patients classically present with pain with palpation of the muscle belly and insertion, passive stretching, and resistance to contraction. In chronic tendonitis, treatment is often lengthy and difficult. Physical therapy is the cornerstone of treatment. It may be facilitated by the judicious use of corticosteroid injections given around the affected tendon(s).

Indications	ICD-9 Code	ICD-10 Code
Enthesopathy of the hip	726.5	M76.8

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying supine on the examination table.
- If pain permits, flex, abduct, and externally rotate the hip.
- Rotate the patient’s head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral and posterior to the affected hip.
2. Locate the symphysis pubis and trace the pubic bone laterally until the origin of the hip adductor muscles.
3. Determine the site of maximal tenderness over the tendons and mark it with an ink pen.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hip.

ANESTHESIA

- Local anesthesia of the skin using a topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle

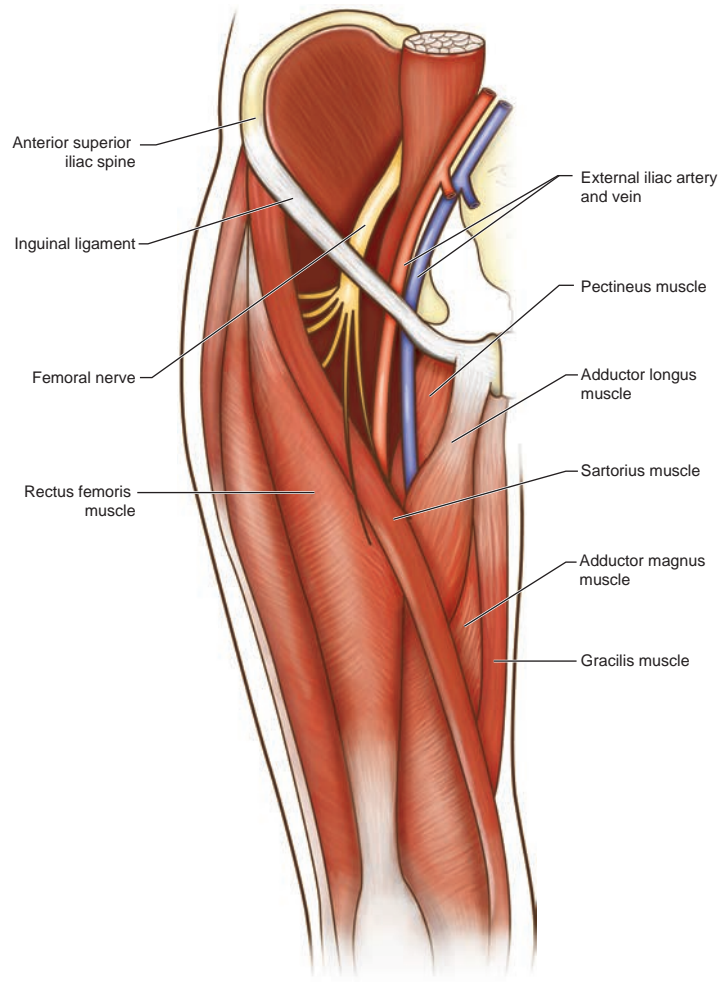


FIGURE 1 ● Anterior muscles of thigh and femoral triangle.

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using a topical vapocoolant spray.
3. Position the needle and syringe at an angle of 30 degrees to the skin with the tip of the needle directed proximally toward the pubic bone.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle so that it is positioned around the affected tendon, but not in the substance of the tendon.



FIGURE 2 ● Hip adductor tendonitis injection.

6. Inject the steroid solution as a bolus around the adductor tendon(s). The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to massage the area and move his or her hip through its full range of motion. This movement distributes the steroid solution along the adductor tendon(s).
10. Reexamine the medial aspect of the hip in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the hip—especially hip abduction and adduction over the next 2 weeks.
- Begin a program of physical therapy.
- NSAIDs, ice, and heat as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of tendon origin or insertion

PEARLS

- This injection can be superficial—especially in thin persons. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.



A video clip showing a hip adductor tendonitis injection can be found on the book's web site.

Knee Joint—Lateral Suprapatellar Approach

Aspiration and injection of the knee joint are common procedures for primary care physicians. The suprapatellar approach to the knee joint is the easiest to perform and is well accepted by patients. Because of supine positioning, patients do not see the approaching needle and anxiety is diminished. This approach is considered a safe procedure since there are no major arteries or nerves in the immediate path of the needle. Also, since the injection is done using the suprapatellar approach, it is extra-articular, but still within the joint space. As a result, joint fluid can be removed and injections performed without direct, large-needle injury to the articular cartilage. Using local anesthetic, this injection can help the clinician differentiate the cause of knee pain. After pain has been eliminated as a complicating factor, the knee can be reexamined to assess integrity of the ligaments and menisci.

Indications	ICD-9 Code	ICD-10 Code
Knee pain	719.46	M25.56
Knee sprain, unspecified site	844.9	S83.6
Knee arthritis, unspecified	716.96	M13.96
Knee arthrosis, primary	715.16	M19.06
Knee arthrosis, posttraumatic	716.16	M19.16
Knee arthrosis, secondary	715.26	M19.26

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying supine on the examination table with both knees slightly flexed and supported with folded towels or chucks pads as needed for patient comfort.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected knee.
2. Locate the superior aspect of the patella.
3. Draw a line vertically 1 cm superior to the proximal margin of the patella (Fig. 2).
4. Next, draw a line horizontally 1 cm below the posterior edge of the patella.
5. Identify the point where these two lines intersect.

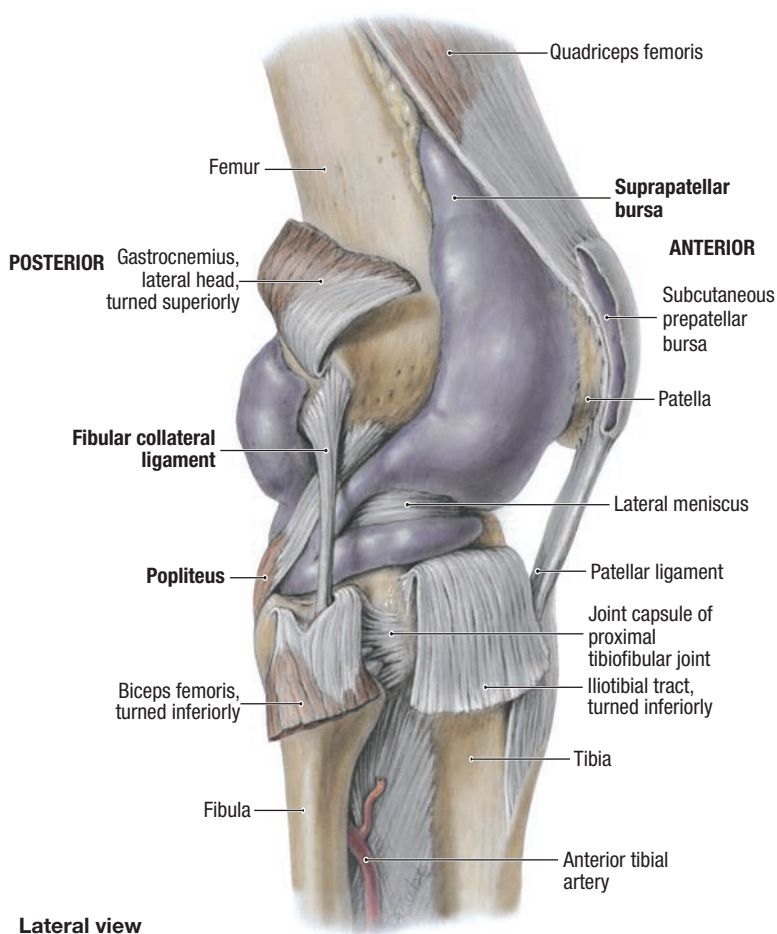


FIGURE 1 ● Right lateral knee—distended joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

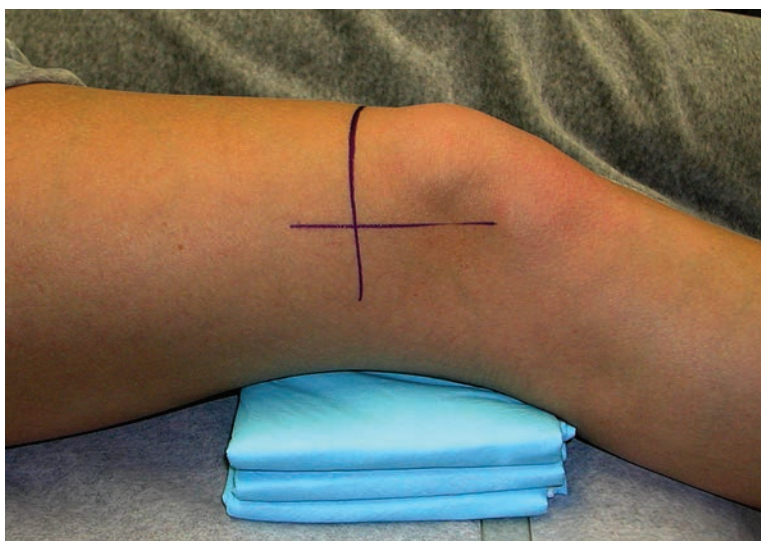


FIGURE 2 ● Right lateral knee—with lines drawn.

6. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
7. After the landmarks are identified, the patient should not move the knee.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.
- Local anesthesia and vasoconstriction of the skin and soft tissues may be augmented using an injection of 10 mL of 1% lidocaine with epinephrine (optional).

EQUIPMENT

- 10-mL syringe—for anesthesia (optional)
- 20- to 60-mL syringe—for aspiration
- 10-mL syringe—for injection of the anesthetic/corticosteroid mixture
- 25-gauge, 1-1/2 in. needle—for anesthesia (optional)
- 18-gauge, 1-1/2 in. needle—for aspiration
- 10 mL of 1% lidocaine with epinephrine—for local anesthesia (optional)
- 8 mL of 1% lidocaine without epinephrine—to dilute the corticosteroid
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- Viscosupplementation agent of choice—if indicated
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. (Optional) Use an ultrasound to image the knee joint using an adjacent, but separate, acoustic window. This allows separate imaging from the injection site so that there is no contamination from the ultrasound gel. Alternatively, the entire site may be prepped in an aseptic manner and sterile ultrasound gel utilized (Fig. 3).
2. Prep the insertion site with alcohol followed by the povidone-iodine pads.
3. Achieve good local anesthesia by using topical vapocoolant spray.
4. Using the no-touch technique, introduce the 25-gauge, 1-1/2 in. needle for local anesthesia at the insertion site. Inject a total of 10 mL of 1% lidocaine with epinephrine to provide adequate local anesthesia. Deposit the anesthetic under the skin, in the soft tissues, and over the periosteum (optional).
5. Position the 18-gauge, 1-1/2 in. needle and syringe perpendicular to the skin, at a right angle to the other two previously drawn skin lines and with the tip of the needle directed medially.
6. Using the no-touch technique, introduce that needle at the insertion site.
7. Advance the needle toward the anterior surface of the distal femur until the needle tip is located in the joint capsule. Apply suction to the syringe while advancing the needle. The appearance of fluid in the syringe indicates that the joint capsule has been entered (Fig. 4). The needle may contact the distal femur itself. Should that happen, withdraw and advance the needle as needed to “walk” it over the femur and into the joint capsule.
8. Multiple syringes may be required in order to drain all of the synovial fluid.



FIGURE 3 ● Right knee joint distended with intra-articular fluid. Note bulging of the joint capsule above the patella.

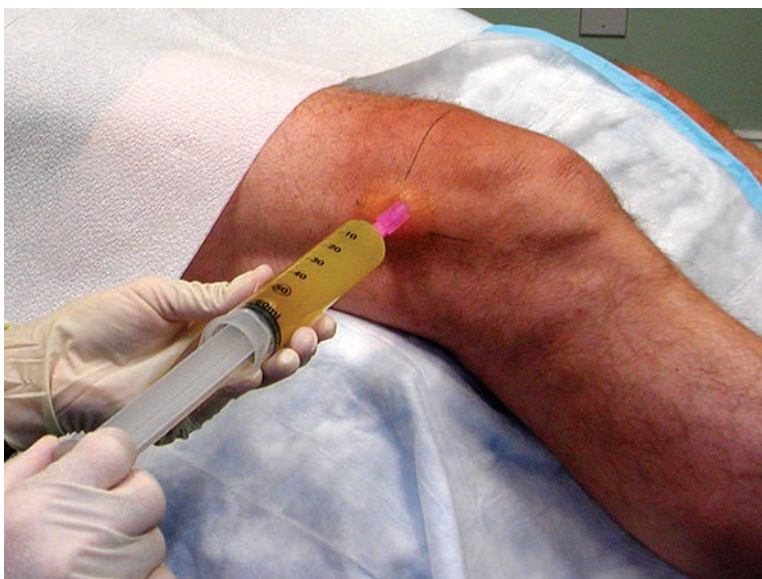


FIGURE 4 ● Right knee aspiration of distended joint—first of the two syringes.

9. If injection following aspiration is elected, remove the large syringe from the 18-gauge needle and then attach the 10-mL syringe filled with the steroid solution (Fig. 5) or the proprietary syringe prefilled with viscosupplement (Fig. 6).
10. Inject the steroid solution as a bolus into the knee joint capsule. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
11. Following injection of the corticosteroid solution or viscosupplement, withdraw the needle.
12. Apply a sterile adhesive bandage.



FIGURE 5 ● Right knee corticosteroid injection.



FIGURE 6 ● Right knee viscosupplementation injection.

13. Instruct the patient to move his or her knee through its full range of motion. This movement distributes the steroid solution throughout the knee joint.
14. Reexamine the knee in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the affected knee over the next 2 weeks.
- Consider the use of a compression knee wrap.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Arthrocentesis, aspiration, and/or injection of major joint or bursa

PEARLS

- Although both the lateral and medial approaches may be used, the preferred approach is from the lateral aspect. This approach affords the operator more room, avoids inadvertent kicking of the clinician by the patient with the uninvolved leg, and preserves patient modesty.
- If the clinician has the unusual situation of experiencing difficulty finding the joint capsule, then either of the following maneuvers can be attempted.
 - Squeeze the interior aspect of the patella and displace it superiorly—thereby shifting the joint fluid and filling the superior aspect of the joint space.
 - Redirect the needle in a distal direction to target the undersurface of the patella. However, this technique may result in an injury to the patellar cartilage.
- Ultrasound-assisted aspiration and injection are indicated in the situation where an effusion is not present or is a small “pocket” of fluid. Ultrasound is also very useful in locating fluid in the knee joint to ensure the accuracy of injecting expensive viscosupplementation products.



A video clip showing a knee injection can be found on the book’s web site.

Knee Joint—Infrapatellar Approach

Aspiration and injection of the knee joint are common procedures for primary care physicians. The infrapatellar approach to the knee joint is more difficult to perform than the suprapatellar approach. It is also less well accepted by patients since it may be done with the patients sitting where they can see the approaching needle. There is increased anxiety to this procedure and the patients are at increased risk of injury if they develop a vasovagal reaction and fall from the exam table. Also, since the injection is intra-articular, the knee cartilage over the distal femur frequently suffers direct damage from the 18-gauge needle. Using local anesthetic, this injection can help the clinician differentiate the cause of knee pain. After pain has been eliminated as a complicating factor, the knee can be reexamined to assess integrity of the ligaments and menisci.

Indications	ICD-9 Code	ICD-10 Code
Knee pain	719.46	M25.56
Knee sprain, unspecified site	844.9	S83.6
Knee arthritis, unspecified	716.96	M13.96
Knee arthrosis, primary	715.16	M19.06
Knee arthrosis, posttraumatic	716.16	M19.16
Knee arthrosis, secondary	715.26	M19.26

Relevant Anatomy: (Fig. 1)

- See previous chapter

PATIENT POSITION

- Lying supine on the examination table with the affected knee flexed at an angle of 30 degrees.
- Alternatively, the patient may be sitting on the examination table or a wheelchair with both knees flexed at 90 degrees.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. Although both the lateral and medial approaches may be used, the preferred approach is from the lateral aspect. This approach avoids inadvertent kicking of the clinician by the patient with the uninvolved leg and preserves patient modesty.
2. With the patient lying supine on the examination table, the clinician stands lateral to the affected knee.

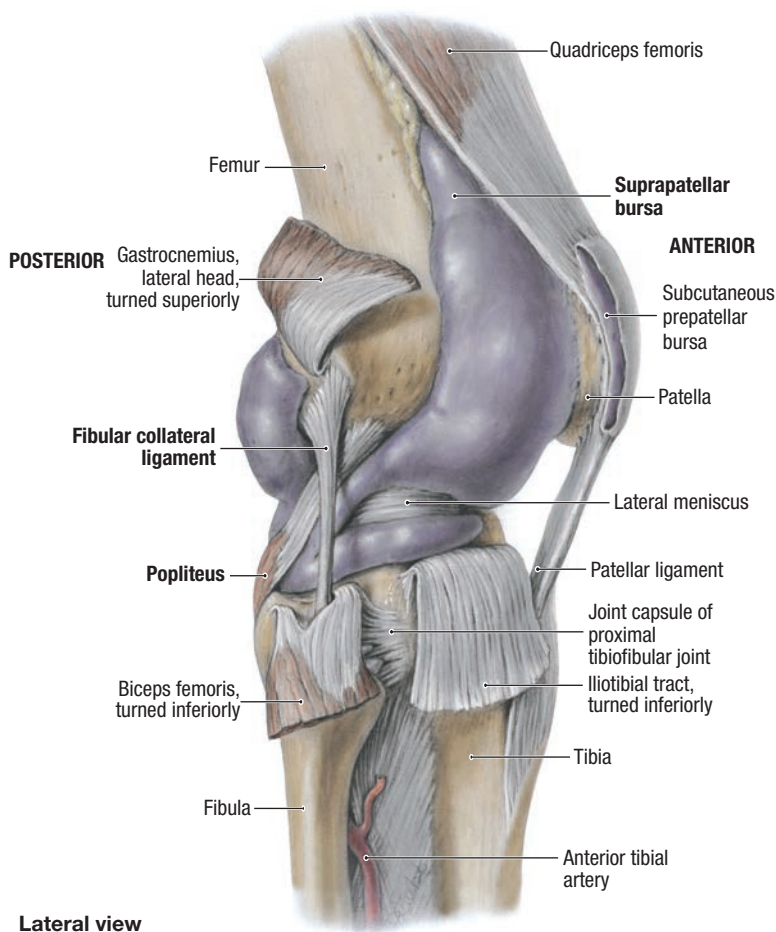


FIGURE 1 ● Right lateral knee—distended joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

3. With the patient sitting up on the examination table or in a chair, the clinician sits in front of the affected knee.
4. Locate the patellar tendon.
5. At the midpoint of the tendon, move about 1 cm laterally. There is usually a depression at that spot. Mark it with ink.
6. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
7. After the landmarks are identified, the patient should not move the knee.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.
- Local anesthesia and vasoconstriction of the skin and soft tissues may be augmented using an injection of 5 mL of 1% lidocaine with epinephrine (optional).

EQUIPMENT

- 5-mL syringe—for anesthesia (optional)
- 20- to 60-mL syringe—for aspiration

- 10-mL syringe—for injection of the anesthetic/corticosteroid mixture
- 25-gauge, 1-1/2 in. needle—for anesthesia (optional)
- 18-gauge, 1-1/2 in. needle—for aspiration
- 5 mL of 1% lidocaine with epinephrine—for local anesthesia (optional)
- 8 mL of 1% lidocaine without epinephrine—to dilute the corticosteroid
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- Viscosupplementation agent of choice—if indicated
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. (Optional) Use an ultrasound to image the knee joint using an adjacent, but separate, acoustic window. This allows imaging separate from the injection site so that there is no contamination from the ultrasound gel. Alternatively, the entire site may be prepped in an aseptic manner and sterile ultrasound gel utilized.
2. Prep the insertion site with alcohol followed by the povidone-iodine pads.
3. Achieve good local anesthesia by using topical vapocoolant spray.
4. Using the no-touch technique, introduce the 25-gauge, 1-1/2 in. needle for local anesthesia at the insertion site. Inject a total of 5 mL of 1% lidocaine with epinephrine to provide adequate local anesthesia. Deposit the anesthetic under the skin, in the soft tissues, and over the periosteum (optional).
5. Position the 18-gauge, 1-1/2 in. needle and syringe perpendicular to the skin with the tip of the needle directed into the center of the knee.
6. Using the no-touch technique, introduce that needle at the insertion site (Fig. 2).
7. Advance the needle toward the center of the knee until the needle tip is located in the joint capsule. Apply suction to the syringe while advancing the needle. The appearance of fluid in the syringe indicates that the joint capsule has been entered.



FIGURE 2 ● Left knee injection—lateral infrapatellar approach.

8. Multiple syringes may be required in order to drain all of the synovial fluid.
9. If injection following aspiration is elected, remove the large syringe from the 18-gauge needle and then attach the 10-mL syringe filled with the steroid solution or the proprietary syringe prefilled with viscosupplement.
10. Inject the steroid solution as a bolus into the knee joint capsule. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
11. Following injection of the corticosteroid solution or viscosupplement, withdraw the needle.
12. Apply a sterile adhesive bandage.
13. Instruct the patient to move his or her knee through its full range of motion. This movement distributes the steroid solution throughout the knee joint.
14. Reexamine the knee in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the affected knee over the next 2 weeks.
- Consider the use of a compression knee wrap.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20610—Arthrocentesis, aspiration, and/or injection of major joint or bursa

PEARLS

- Because of potential direct needle injury to articular cartilage, the infrapatellar approach should only be used in circumstances where the suprapatellar approach cannot be performed. This may occur in patients with local cellulitis, soft tissue injury, or in a patient confined to a wheelchair who cannot be easily moved onto an examination table.
- Ultrasound-assisted aspiration and injection are indicated in the situation where an effusion is not present or is a small “pocket” of fluid. Ultrasound is also very useful in locating fluid in the knee joint to ensure the accuracy of injecting expensive viscosupplementation products.

Prepatellar Bursitis

Prepatellar bursitis is a relatively common aspiration and injection site for primary care physicians. Successful aspiration is usually easy because the location of bursa is readily evident. The subcutaneous prepatellar bursa may become inflamed and accumulate fluid when subjected to repeated excessive pressure or friction. The fluid may consist of blood in acute trauma, thick proteinaceous mucoid fluid after repetitive injury, or purulence if infected. Corticosteroids should never be administered if an infectious bursitis is suspected.

A large diameter needle is appropriate as this technique is used to aspirate large volume of fluid. Occasionally, the clinician may elect to inject a steroid solution if the fluid reaccumulates—as long as an infection can be excluded.

Indications	ICD-9 Code	ICD-10 Code
Prepatellar bursitis	726.65	M70.4

Relevant Anatomy

- See Figure 1 in the chapter—Knee Joint—Lateral Suprapatellar Approach

PATIENT POSITION

- Lying supine on the examination table with both knees slightly flexed and supported with folded towels or chucks pads as needed for patient comfort.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected knee.
2. The point of maximal fluctuance is identified.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the knee.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 20-mL syringe
- 3-mL syringe—for optional injection

- 18-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine—for optional injection
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)—for optional injection
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the 18-gauge needle and syringe with the tip of the needle directed toward the area of maximal fluid collection.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 1).
5. Advance the needle into the center of the bursa.
6. Aspiration should be easily accomplished. Use multiple syringes if the effusion is large.
7. If injection following aspiration is elected, grasp the hub of the needle, remove the large syringe, and then attach the 3-mL syringe filled with the steroid solution.
8. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following complete aspiration, and possible injection of corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage followed by a compressive elastic bandage.
11. Reexamine the knee in 5 min to confirm pain relief.

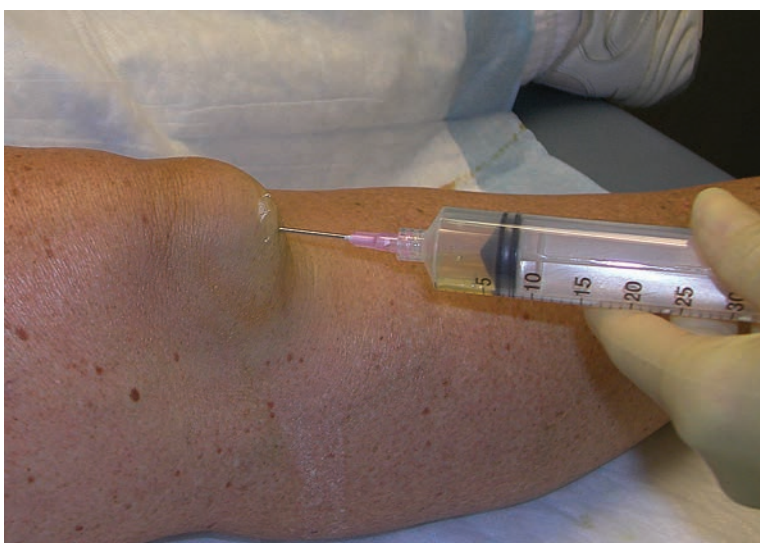


FIGURE 1 ● Prepatellar bursitis aspiration.

AFTERCARE

- Avoid excessive use of the affected knee over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Aspiration and/or injection of intermediate bursa

PEARLS

- If the prepatellar bursitis is due to an infection or acute hemorrhagic event, do not follow aspiration with corticosteroid injection.
- Injection of corticosteroid solution is usually reserved for recurrent bursitis.

Pes Anserine Bursitis

Injection of corticosteroids for the treatment of pes anserine bursitis is a rare procedure for primary care physicians. The pes anserinus is the common insertion for the tendons of the sartorius, gracilis, and semitendinosus muscles. It is located over the medial aspect of the proximal tibia about 2 to 5 cm below the anteromedial joint margin of the knee. Pain and swelling may occur with overuse or excessive valgus stress on the knee. It is most commonly seen in overweight, middle-aged, and older women. A small-diameter needle is appropriate as there will not be a fluid collection.

Indications

Pes anserine bursitis

ICD-9 Code

726.61

ICD-10 Code

M70.5

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying supine on the examination table with both knees slightly flexed and supported with folded towels or chucks pads as needed for patient comfort.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected knee.
2. The point of maximal tenderness over the proximal medial anterior tibia is identified.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the knee.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)

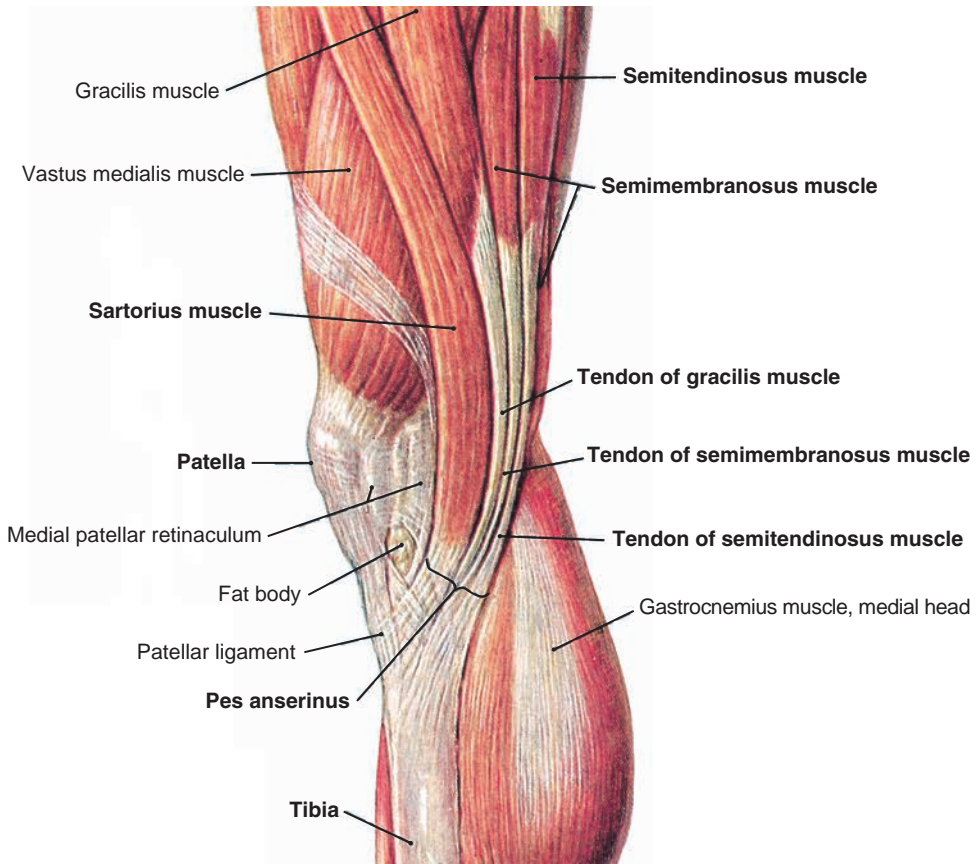


FIGURE 1 ● Medial right leg. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile, adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the area of maximal tenderness at the insertion of the tendons.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the bone of the proximal medial tibia. Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus into this area. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.



FIGURE 2 ● Left knee pes anserine bursitis injection.

9. Instruct the patient to massage this area and move his or her knee through its full range of motion. This movement distributes the steroid solution throughout the pes anserine bursa and related tendons.
10. Reexamine the pes anserine bursa in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive knee extension and adduction over the next 2 weeks.
- Consider the use of a knee compression wrap.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of single tendon origin or insertion

PEARLS

- The pes anserine bursa is superficial. As a result, this injection can be complicated by the development of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while injecting the corticosteroid solution.
- Since this is an unusual diagnosis, also consider a medial meniscal tear, chondral fracture, or osteonecrosis of the tibia.

Iliotibial Band Friction Syndrome

Injection of corticosteroids for the treatment of iliotibial band friction syndrome is a fairly common procedure for primary care physicians who care for long distance runners. This overuse condition occurs as a result of friction of the iliotibial tract as it passes over the lateral femoral condyle. A small-diameter needle is appropriate as there will not be a fluid collection.

Indications	ICD-9 Code	ICD-10 Code
Iliotibial band syndrome	728.89	M76.3

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Lying supine on the examination table with both knees slightly flexed and supported with folded towels or chucks pads as needed for patient comfort.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected knee.
2. The point of maximal tenderness over the lateral femoral condyle is identified.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the knee.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40mg of triamcinolone acetonide)
- One alcohol prep pad

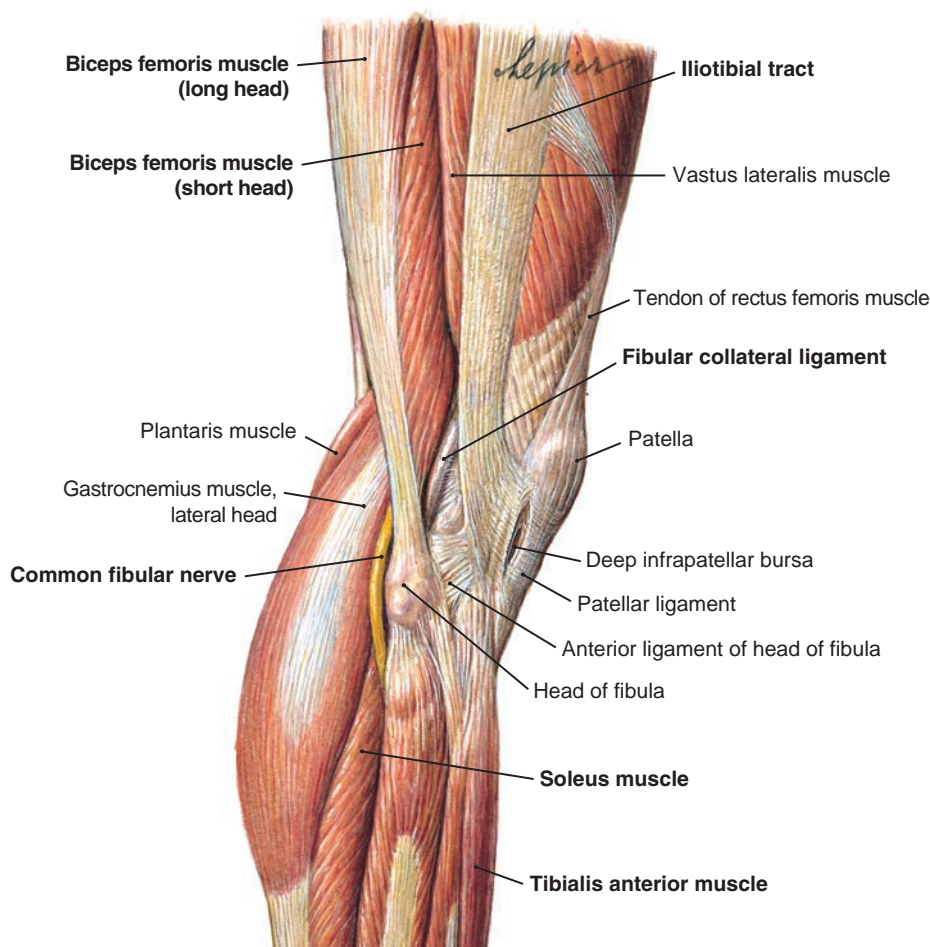


FIGURE 1 ● Lateral right leg. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile, adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the area of maximal tenderness over the lateral femoral condyle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle through the iliotibial band and touch the bone of the lateral femoral condyle. Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus into this area. The injected solution should flow smoothly into the tissues. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.



FIGURE 2 ● Left leg iliotibial band injection.

7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to massage this area and move his or her knee through its full range of motion. This movement distributes the steroid solution throughout the pes anserine bursa and related tendons.
10. Reexamine the lateral aspect of the knee in 5 min to confirm pain relief.

AFTERCARE

- Relative rest with avoidance of excessive running for the next 2 weeks.
- Consider the use of a knee-compression wrap.
- IT band stretching exercises.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20551—Injection of single tendon origin or insertion

PEARLS

- The iliotibial band can be superficial, especially in thin persons. As a result, this injection can be complicated by the development of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while injecting the corticosteroid solution.



A video clip showing a iliotibial band injection can be found on the books website.

Tibialis Posterior Tendonitis

The tibialis posterior muscle originates from the interosseous membrane and the adjacent posterior surface of the tibia in the proximal third of the leg. It curves behind the medial malleolus, passes under the flexor retinaculum, and inserts into the tuberosity of the navicular bone. The muscle plantarflexes the ankle and inverts the foot. Tibialis posterior tendon dysfunction is an often unrecognized disabling cause of progressive flatfoot deformity and is the most frequently ruptured tendon in the rear foot. Tenosynovitis of the tibialis posterior tendon occurs as a result of altered mechanics of the foot, acute trauma, and chronic overuse or with inflammatory conditions such as rheumatoid arthritis. Patients present with pain, difficulty walking, and swelling along the medial malleolus and the arch of the foot. Discrete injections of corticosteroids decrease pain and facilitate physical therapy. Orthotics are often used to support the arch. Surgery is required in the case of tendon rupture.

Indications

Tibialis posterior tenosynovitis

ICD-9 Code

726.72

ICD-10 Code

M76.8

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the hip in full external rotation, knee slightly flexed, and the ankle in a neutral position.
- Alternatively, lying on the examination table on the affected side with the knee slightly flexed and the ankle in a neutral position.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands or sits medial to the affected ankle.
2. Palpate the medial malleolus of the tibia.
3. Locate the tibialis posterior tendon immediately behind and below the medial malleolus.
4. Determine the location of maximal tenderness along the tendon.
5. Identify a point along the tendon 1 cm distal to the point of maximal tenderness and mark it in ink.
6. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
7. After the landmarks are identified, the patient should not move the ankle.

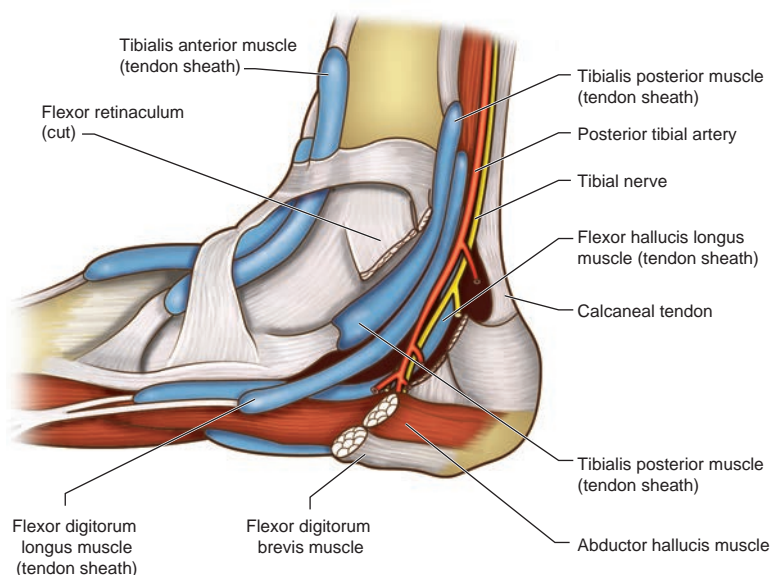


FIGURE 1 ● Medial aspect of the right foot.

ANESTHESIA

- Local anesthesia of the skin with topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile, adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe with the needle tip directed proximally at a 30 degree angle to the surface of the skin.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until it touches the tibialis posterior tendon. Back up the needle 1 to 2 mm.
6. Slowly inject the volume of the syringe around the tendon. The injected solution should flow smoothly into the synovial sheath. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.



FIGURE 2 ● Tibialis posterior tendonitis injection.

8. Instruct the patient to move his or her ankle through its full range of motion. This movement distributes the steroid solution throughout the tibialis posterior tendon sheath.
9. Reexamine the tendon in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive use of the foot over the next 2 weeks.
- Begin a program of physical therapy.
- Use orthotics or motion-control running shoes if there is excessive foot pronation.
- NSAIDs, ice, and heat as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of single tendon sheath

PEARLS

- This injection can be superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.



A video clip showing a tibialis posterior tendonitis injection can be found on the book's web site.

Tarsal Tunnel Syndrome

Tarsal tunnel syndrome is an uncommon condition encountered in primary care. It represents a compressive injury to the posterior tibial nerve as it passes underneath the flexor retinaculum at the level of the medial malleolus. It may occur due to trauma from crush injury, stretch injury, fractures, dislocations, and severe ankle sprains. Other causes include valgus foot deformity, compression from bony prominences, and systemic conditions such as diabetes, hypothyroidism, rheumatoid arthritis, or amyloidosis. Typical symptoms are pain and paresthesias that radiate from the medial ankle. A positive Tinel sign may be elicited posterior to the medial malleolus. Electrodiagnostic tests can help confirm the diagnosis. Conservative treatment options include relative rest, physical therapy, orthotics, splints, and the injection of corticosteroids. Surgical decompression of the tarsal tunnel is required for persistent symptoms.

Indications

Tarsal tunnel syndrome

ICD-9 Code

355.5

ICD-10 Code

G57.5

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the hip in full external rotation, the knee slightly flexed, and the ankle in a neutral position.
- Alternatively, lying on the examination table on the affected side with the knee slightly flexed and the ankle in a neutral position.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands medial to the affected ankle.
2. Locate the medial malleolus of the tibia and then the insertion of the Achilles tendon into the calcaneus.
3. Midway between these two structures, palpate the posterior tibial artery.
4. The posterior tibial nerve is located about 0.5 cm posterior to the posterior tibial artery. Mark the nerve with ink.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the ankle.

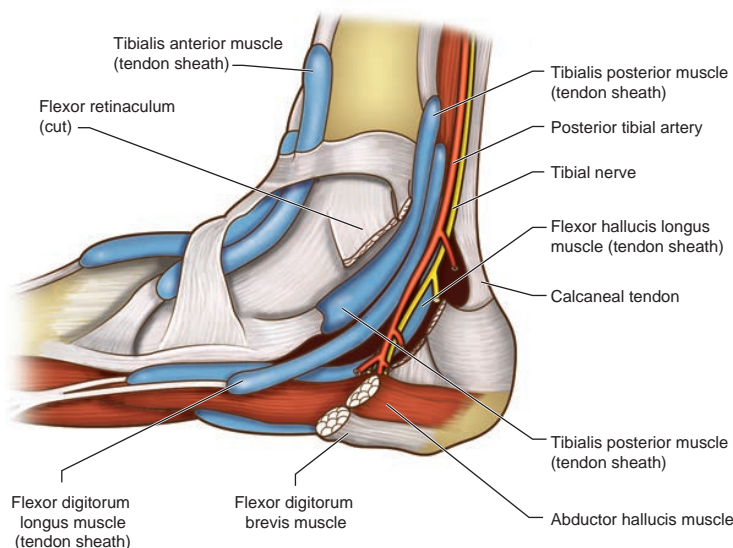


FIGURE 1 ● Medial aspect of the right foot.

ANESTHESIA

- Local anesthesia of the skin using a topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using a topical vapocoolant spray.
3. Position the needle and syringe with the needle tip directed perpendicularly to the surface of the skin with the tip of the needle directed laterally toward the nerve.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle about 1 cm deep. If any pain, paresthesia, or numbness is encountered, back up the needle 1 to 2 mm.
6. Aspirate with the syringe to ensure that the needle tip is not in the posterior tibial artery or vein.
7. Slowly inject the volume of the syringe as a bolus around the posterior tibial nerve and into the tarsal tunnel. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.



FIGURE 2 ● Tarsal tunnel injection.

8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her ankle through its full range of motion. This movement distributes the steroid solution along the nerve and throughout the tarsal tunnel.
11. Reexamine the foot in 5 min to confirm pain relief or the development of numbness in the distribution of the posterior tibial nerve from the local anesthetic.

AFTERCARE

- Avoid excessive use of the foot over the next 2 weeks.
- Begin a program of physical therapy.
- Use orthotics or motion-control running shoes if there is excessive foot pronation.
- Consider splinting—especially at night.
- NSAIDs, ice, and heat as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

PEARLS

- Warn the patient that the posterior tibial nerve may be contacted when using this approach. Ask him or her to calmly report any pain or electrical shock sensation without jerking his or her foot away.
- This injection can be superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of the corticosteroid solutions.

Ankle Joint—Anterior-Lateral Approach

Injection of the ankle joint is a fairly uncommon procedure in primary care. Ankle joint pain may occur following a trauma or with osteoarthritis, gout, rheumatoid arthritis, or other inflammatory conditions. A small-diameter needle is appropriate as this technique is primarily used to inject steroid solution into the ankle joint. Occasionally, there will be a small amount of joint fluid to be aspirated.

Indications	ICD-9 Code	ICD-10 Code
Ankle pain	719.47	M25.57
Ankle sprain, unspecified site	845.00	S93.4
Ankle arthritis, unspecified	716.97	M13.97
Ankle arthrosis, primary	715.17	M19.07
Ankle arthrosis, posttraumatic	716.17	M19.17
Ankle arthrosis, secondary	715.27	M19.27

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

1. Supine on the examination table.
2. The knee on the affected side is placed in 90 degrees of flexion.
3. The ankle is slightly plantar flexed so that the plantar surface is in full contact with the chucks pad covering the exam table.
4. Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected ankle.
2. Locate the junction between the fibula, distal tibia, and talus over the anterior-lateral aspect of the ankle.
3. Mark a point over this articulation. There is normally a depression in that area.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the ankle.

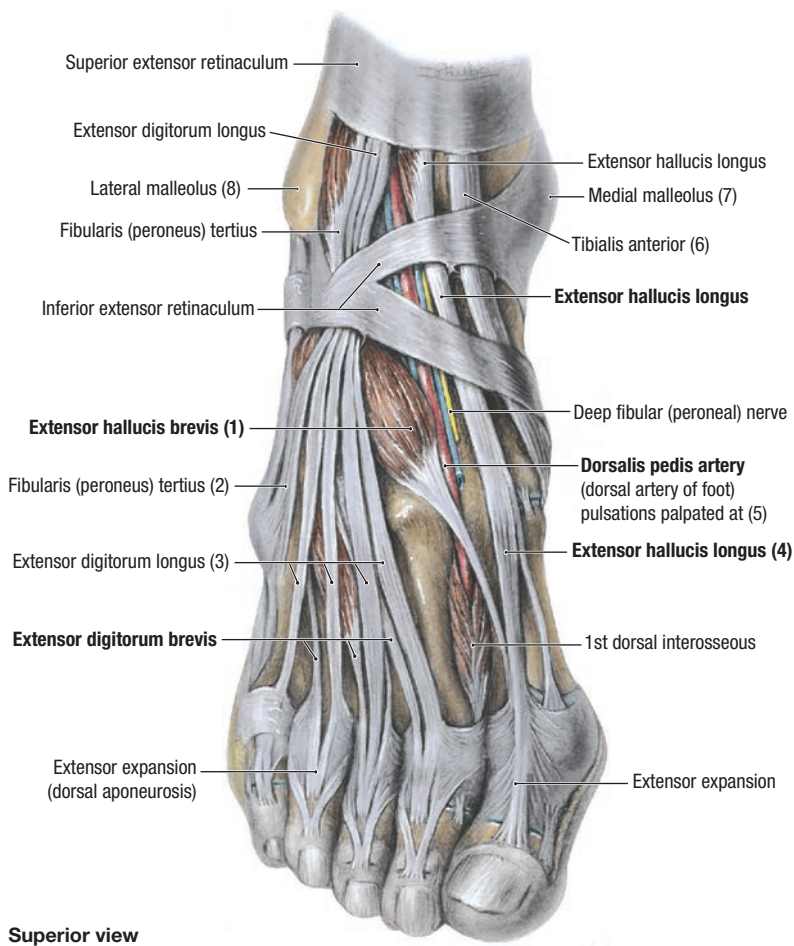


FIGURE 1 ● Right anterior ankle. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 20-mL syringe—for optional aspiration
- 3-mL syringe—for injection
- 20-gauge, 1 in. needle—for optional aspiration
- 25-gauge, 1-1/2 in. needle—if not aspirating fluid
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad



FIGURE 2 ● Right anterior-lateral ankle joint injection.

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the center of the ankle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the ankle joint. This places the needle tip between the distal tibia and fibula in the ankle joint.
6. If aspirating, withdraw the fluid using a 20-gauge, 1-1/2 in. needle with the 20-mL syringe.
7. If only injecting corticosteroid solution, use a 25-gauge, 1-1/2 in. needle with the 3-mL syringe.
8. If injection following aspiration is elected, remove the large syringe from the 20-gauge needle and then attach the 3-mL syringe filled with the steroid solution.
9. Inject the steroid solution as a bolus into the ankle joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.
12. Instruct the patient to move his or her ankle through its full range of motion. This movement distributes the steroid solution throughout the ankle joint.
13. Reexamine the ankle in 5 min to confirm pain relief.

AFTERCARE

- Consider the use of an ankle brace.
- Avoid vigorous use of the ankle over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

PEARLS

- Insert the needle medially to the anterior tibialis tendon in order to avoid injury to the anterior tibial artery, anterior tibial vein, and peroneal nerve.



A video clip showing an ankle joint injection can be found on the book's web site.

Ankle Joint— Anterior-Medial Approach

Injection of the ankle joint is a fairly uncommon procedure in primary care. Ankle joint pain may occur following a trauma or with osteoarthritis, gout, rheumatoid arthritis, or other inflammatory conditions. A small-diameter needle is appropriate as this technique is primarily used to inject steroid solution into the ankle joint. Occasionally, there will be a small amount of joint fluid to be aspirated.

Indications	ICD-9 Code	ICD-10 Code
Ankle pain	719.47	M25.57
Ankle sprain, unspecified site	845.00	S93.4
Ankle arthritis, unspecified	716.97	M13.97
Ankle arthrosis, primary	715.17	M19.07
Ankle arthrosis, posttraumatic	716.17	M19.17
Ankle arthrosis, secondary	715.27	M19.27

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table.
- The knee on the affected side is placed in 90 degrees of flexion.
- The ankle is slightly plantar flexed so that the plantar surface is in full contact with the chucks pad covering the exam table.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands medial to the affected ankle.
2. Locate the junction between the fibula, distal tibia and talus over the anteriorlateral aspect of the ankle.
3. Mark a point over this articulation. There is normally a depression in that area.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the ankle.

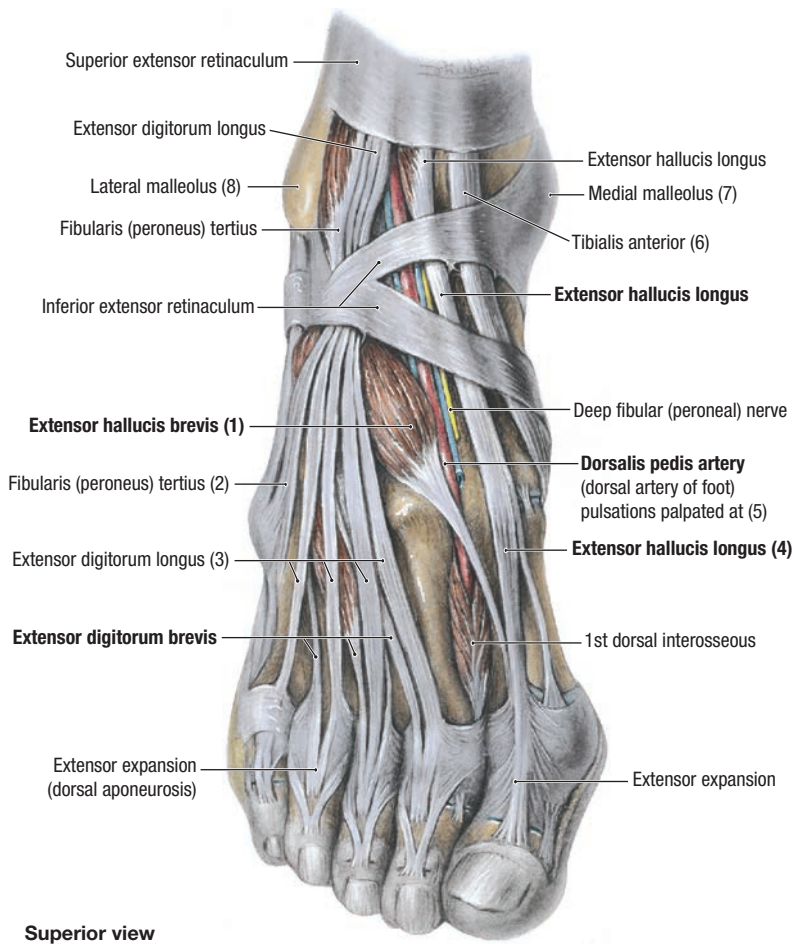


FIGURE 1 ● Right anterior ankle. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

EQUIPMENT

- 20-mL syringe—for optional aspiration
- 3-mL syringe—for injection
- 20-gauge, 1 in. needle—for optional aspiration
- 25-gauge, 1-1/2 in. needle—if not aspirating fluid
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad



FIGURE 2 ● Right anterior-medial ankle joint injection.

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed toward the center of the ankle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the ankle joint. This places the needle tip between the distal tibia and fibula in the ankle joint.
6. If aspirating, withdraw the fluid using a 20-gauge, 1-1/2 in. needle with the 20-mL syringe.
7. If only injecting corticosteroid solution, use a 25-gauge, 1-1/2 in. needle with the 3-mL syringe.
8. If injection following aspiration is elected, remove the large syringe from the 20-gauge needle and then attach the 3-mL syringe filled with the steroid solution.
9. Inject the steroid solution as a bolus into the ankle joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.
12. Instruct the patient to move his or her ankle through its full range of motion. This movement distributes the steroid solution throughout the ankle joint.
13. Reexamine the ankle in 5 min to confirm pain relief.

AFTERCARE

- Consider the use of an ankle brace.
- Avoid vigorous use of the affected ankle over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

PEARLS

- Insert the needle medially to the anterior tibialis tendon in order to avoid injury to the anterior tibial artery, anterior tibial vein, and peroneal nerve.



A video clip showing an ankle joint injection can be found on the book's web site.

Fibularis Brevis Tendonitis

Injection of corticosteroids for the treatment of tendonitis of the fibularis brevis (formerly known as the peroneus brevis) tendon is a fairly uncommon procedure for primary care physicians. The fibularis longus and brevis tendons are often injured with inversion ankle sprains. This can cause chronic subluxation of the tendons. Overuse from repeated forceful plantar flexion and resisted foot eversion may also occur.

Indications	ICD-9 Code	ICD-10 Code
Peroneus brevis tendonitis	726.79	M76.7

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table.
- The ankle and the knee on the affected side are supported by placing rolled towels underneath them.
- The ankle is in a neutral position.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral to the affected foot.
2. While the foot is held in a position of active eversion, identify tenderness at and immediately proximal to the head of the fifth metatarsal bone.
3. Palpate the fibularis brevis tendon along its course from posterior and distal to the lateral malleolus to its insertion into the head of the fifth metatarsal bone.
4. Locate the area of maximal tenderness.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the ankle.

ANESTHESIA

- Local anesthesia of the skin using a topical vapocoolant spray.

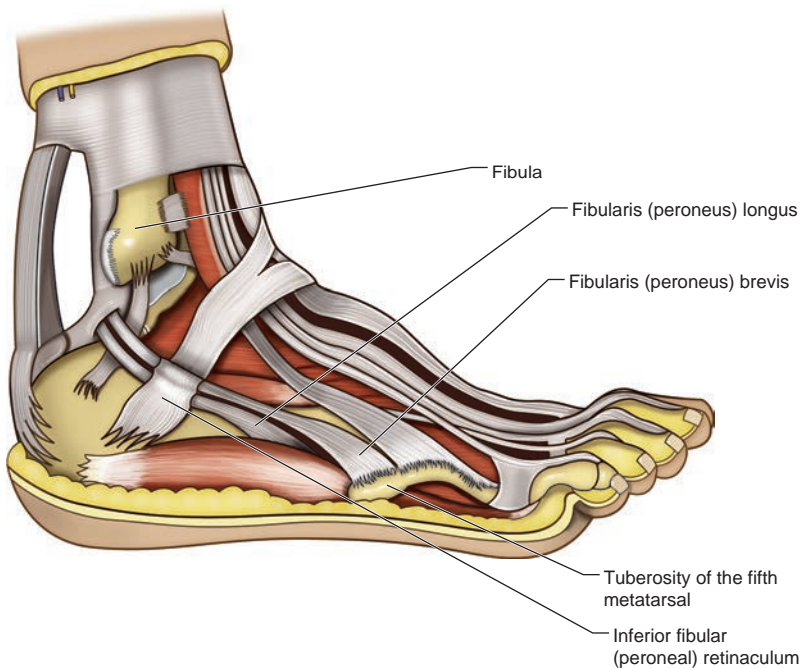


FIGURE 1 ● Lateral aspect of right foot.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using a topical vapocoolant spray.
3. If treating tendonitis at the insertion of the fibularis brevis on the fifth metacarpal:
 - a. Position the needle and syringe at an angle of 30 degrees to the skin with the needle tip directed distally.
 - b. Using the no-touch technique, introduce the needle at the insertion site.
 - c. Advance the needle slowly until the needle tip touches the tendon/bone junction. Back up the needle 1 to 2 mm.
 - d. Inject the steroid solution slowly as a bolus around the insertion of the fibularis brevis tendon into the head of the fifth metatarsal. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.



FIGURE 2 ● Injection of the peroneus brevis tendon insertion.



FIGURE 3 ● Injection of the right fibularis brevis tendon insertion.

4. If treating tendonitis along the course of the fibularis brevis tendon proximal to its insertion:
 - a. Position the needle and syringe at an angle of 30 degrees to the skin with the needle tip directed proximally.
 - b. Using the no-touch technique, introduce the needle at the insertion site (Figs. 2 and 3).
 - c. Advance the needle slowly until the needle tip touches the tendon. Back up the needle 1 to 2 mm.
 - d. Inject the steroid solution slowly as a bolus around the fibularis brevis tendon. A small bulge in the shape of a sausage may develop in the tendon sheath. The injected solution should flow smoothly into the tenosynovial space. If increased

resistance is encountered, advance or withdraw the needle slightly before attempting further injection.

5. Following injection of the corticosteroid solution, withdraw the needle.
6. Apply a sterile adhesive bandage.
7. Instruct the patient to move his or her ankle through its full range of inversion and eversion. This movement distributes the steroid solution throughout the fibularis brevis tenosynovial sheath.
8. Reexamine the foot in 5 min to confirm pain relief.

AFTERCARE

- Ensure no excessive plantar flexion over the next 2 weeks by the use of an ankle-foot orthotic or walking cast.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

CPT code: 20550—Injection of single tendon sheath

PEARLS

- The fibularis brevis tendon is superficial. As a result, this injection can be complicated by the development of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while injecting the corticosteroid solution.



A video clip showing a fibularis brevis tendon injection can be found on the book's web site.

Plantar Fasciitis

Injection of corticosteroids for the treatment of plantar fasciitis is a common procedure for primary care physicians. This condition is a repetitive motion injury to the origin of the plantar aponeurosis at the medial tubercle of the calcaneus. It is usually caused by an excessive pronation of the foot—especially in persons with pes planus. The pain with this condition is worst when bearing weight after a period of rest.

Indications	ICD-9 Code	ICD-10 Code
Plantar fasciitis	728.71	M72.2

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table with the hip in full external rotation, the knee slightly flexed, and the ankle in a neutral position.
- Alternatively, lying on the examination table on the affected side with the knee slightly flexed and the ankle in a neutral position.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands medial to the affected foot.
2. Identify the point of maximal tenderness over the plantar aspect of the foot. This is usually just medial to the midline over the medial tubercle of the calcaneus.
3. Draw a vertical line down the posterior border of the tibia.
4. Draw a horizontal line one fingerbreadth above the plantar surface.
5. Mark the point where these two lines intersect over the medial aspect of the foot.
6. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
7. After the landmarks are identified, the patient should not move the foot or ankle.

ANESTHESIA

- Local anesthesia of the skin using a topical vapocoolant spray.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle

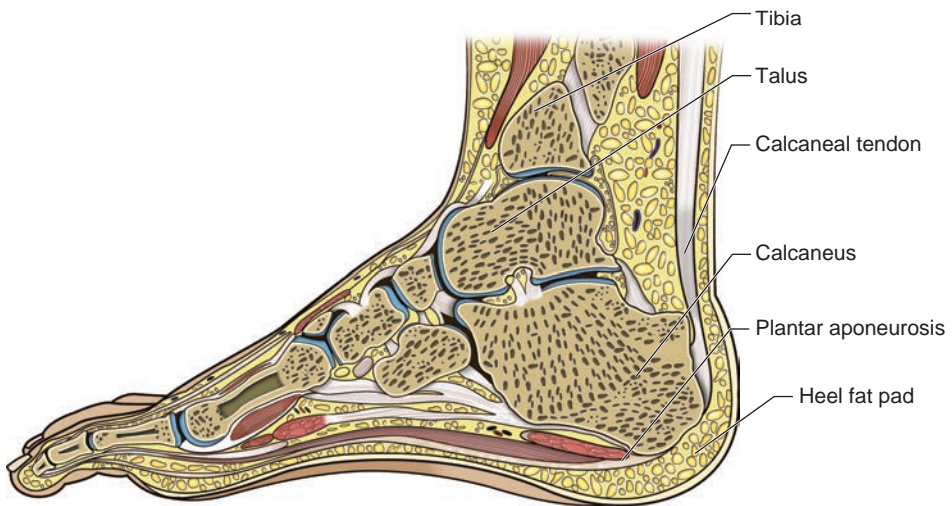


FIGURE 1 ● Medial right foot—sagittal section.

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin and the intersection of the two landmark lines with the tip of the needle directed laterally.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the medial tubercle of the calcaneus until the needle tip is located at the origin of the plantar fascia.
6. Inject the steroid solution as a bolus at the origin of the plantar fascia. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to massage the area and then take several steps. This movement distributes the steroid solution along the plantar fascia.
10. Reexamine the foot in 5 min to confirm pain relief.

AFTERCARE

- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Instruct the patient to perform heel cord stretching exercises four times a day.
- Wear proper shoes or orthotics as indicated.
- Consider the use of a tension night splint.
- Consider follow-up examination in 2 weeks.



FIGURE 2 ● Right foot plantar fasciitis injection.

CPT code: 20550—Injection of aponeurosis

PEARLS

- The plantar fascia injection may be quite painful. This is especially true if the injection is performed through the plantar surface of the foot. The medial approach described above minimizes the pain of this procedure.
- Notice the thickness of the plantar fat pad in the anatomic drawing. The injection should be placed superior to the fat pad in order to prevent fat atrophy in this critical area.



A video clip showing a plantar fasciitis injection can be found on the book's web site.

First Metatarsophalangeal Joint

The first metatarsophalangeal (MTP) joint of the foot is a relatively common aspiration and injection site for primary care physicians. This joint is the most commonly involved joint with gout and is frequently affected by osteoarthritis.

Indications	ICD-9 Code	ICD-10 Code
Pain of first MTP joint	719.47	M25.57
Acute gouty arthritis unspecified, toe	274.0	M10.97
First MTP joint arthritis, unspecified	716.97	M13.97
First MTP joint arthrosis, primary	715.17	M19.07
First MTP joint arthrosis, posttraumatic	716.17	M19.17
First MTP joint arthrosis, secondary	715.27	M19.27

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table.
- The knee on the affected side is placed in 90 degrees of flexion.
- The ankle is slightly plantar flexed so that the plantar surface is in full contact with the chucks pad covering the exam table.
- Rotate the patient’s head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands medial to the affected foot.
2. Locate the first MTP joint with simultaneous palpation and flexion/extension of the great toe proximal phalanx. The patient will report tenderness in this joint and there may be associated erythema and swelling.
3. The injection point is directly over the first MTP joint.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the foot or toe.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

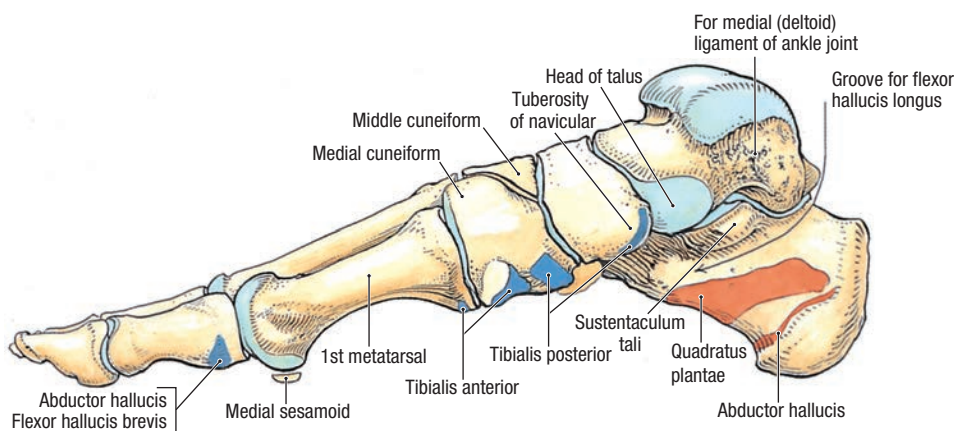


FIGURE 1 ● Right medial foot bony anatomy. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

EQUIPMENT

- 3-mL syringe
- 5-mL syringe—for optional aspiration
- 25-gauge, 5/8 in. needle
- 20-gauge, 1 in. needle—for optional aspiration
- Hemostat—for optional injection following aspiration
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed into the center of the joint.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until the tip is located in the joint capsule. If the needle contacts bone or cartilage, back up the needle 1 to 2 mm.
6. If aspirating, withdraw fluid using the 20-gauge, 1 in. needle with a 5-mL syringe.
7. If injection following aspiration is elected, remove the 5-mL syringe from the 20-gauge needle and then attach the 3-mL syringe filled with the steroid solution.
8. If only injecting corticosteroid solution, use a 25-gauge, 5/8 in. needle with the 3-mL syringe.
9. Inject the steroid solution as a bolus into the joint capsule. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.



FIGURE 2 ● Right first MTP joint injection.

12. Instruct the patient to move his or her toe through its full range of motion. This movement distributes the steroid solution throughout the joint capsule.
13. Reexamine the first MTP joint in 5 min to confirm pain relief.

AFTERCARE

- Avoid excessive movement of the first MTP joint over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider the use of an ankle foot orthotic or wooden soled shoe.
- Consider follow-up examination in 2 weeks.

CPT code: 20600—Injection of small joint

PEARLS

- Applying traction to the great toe in a distal direction may help open up the joint to accommodate the needle.



A video clip showing a first MTP joint injection can be found on the book's web site.

Morton Interdigital Neuroma

Compression of the interdigital nerves in the foot can result in a painful condition referred to as Morton neuroma. This is a fairly common condition seen by primary care physicians. The condition is a repetitive compressive injury causing enlargement of the interdigital nerve. Irritation of the neuroma causes symptoms of lancinating pain and dysesthesias with weight bearing—especially when wearing shoes with a narrow toe box. Usually, the neuroma lies between the second and third or the third and fourth metatarsal heads.

Indications

Morton neuroma

ICD-9 Code

355.6

ICD-10 Code

G57.6

Relevant Anatomy: (Fig. 1)

PATIENT POSITION

- Supine on the examination table.
- The knee on the affected side is placed in 90 degrees of flexion.
- The ankle is slightly plantar flexed so that the plantar surface is in full contact with the chucks pad covering the exam table.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

LANDMARKS

- With the patient lying supine on the examination table, the clinician stands or sits distal to the affected foot.
- Locate the site of maximal tenderness. This is found between the heads of the metatarsals. The most common site is between the second and third metatarsals.
- The injection point is on the dorsal aspect of the distal foot directly over the area of maximal tenderness. A tender nodule may be palpated occasionally at this site.
- At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
- After the landmarks are identified, the patient should not move the foot.

ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

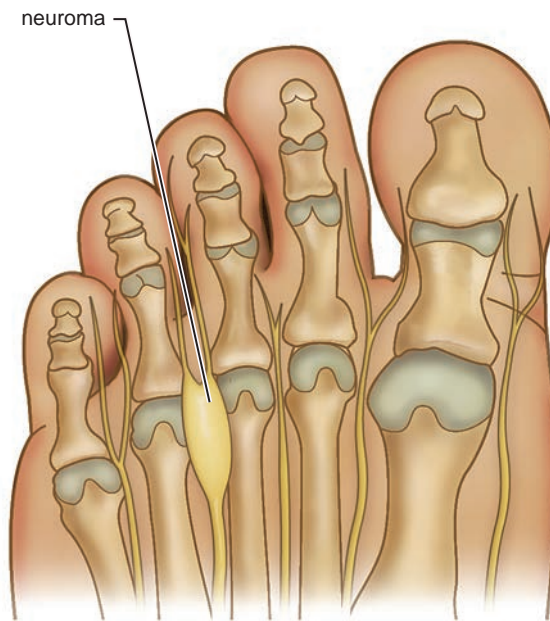


FIGURE 1 ● Right foot plantar aspect—with Morton neuroma.

EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the tip of the needle directed inferiorly between the affected metatarsal heads.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until the needle tip is located between the metatarsal heads.
6. Inject the steroid solution as a bolus around the neuroma. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to massage the area of injection. This movement distributes the steroid solution around the neuroma.
10. Reexamine the foot in 5 min to confirm pain relief.



FIGURE 2 ● Morton neuroma injection.

AFTERCARE

- Avoid wearing shoes with a narrow toe box.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider metatarsal pads or custom orthotics.
- Consider follow-up examination in 2 weeks.

CPT code: 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch



A video clip showing a Morton neuroma injection can be found on the book's web site.

Consent for Needle Aspiration and/or Injection

Date: _____

I hereby authorize _____
(Provider's name)

to perform upon _____
(Patient's name)

the following procedure(s): _____

The procedure(s) consists of: _____

(Describe in lay language)

Possible risks associated with the performance of a needle injection/aspiration may include but are not limited to:

Bleeding, Infection, Local pain, Fainting, Allergic reaction, or _____

Possible risks with the use of injected corticosteroids may include but are not limited to:

Feeling flushed

Tendon rupture

Abnormal skin color

Impaired immune response

Irregular menstrual periods

Flare-up of joint inflammation

Abnormal thinning of the skin

Worsening blood sugars in diabetes

Disturbance of hormone balance

The nature of this procedure, methods of diagnosis/treatment, and possible alternatives have been explained to me by _____ or his/her associate. I am aware that there are certain risks associated with this procedure and that the practice of medicine and surgery is not an exact science. I acknowledge that no guarantees have been made to me concerning the results of the procedure or its interpretation.

I certify that I understand the contents of this form:

Signature of patient or authorized representative

Witness

IF THE PATIENT IS UNABLE TO CONSENT OR IS A MINOR, COMPLETE THE FOLLOWING:

Patient is a minor, ____ years of age, or is unable to consent because _____
_____ (strike or define).

The undersigned hereby consents to the performance of the above described diagnostic/therapeutic procedure on the above patient as well as any tests, which are deemed necessary.

Signature of authorized representative

Aspiration and Injection Aftercare Handout

You have just had a procedure done by: _____

Your diagnosis is: _____

The procedure involved placing a needle into the tissues to:

_____ withdraw fluid from the _____

_____ inject “cortisone” into the _____

_____ other _____

Please Follow These Instructions:

Recurring Pain:

Injections are usually done using a local anesthetic such as lidocaine and cortisone. The anesthetic effect of the lidocaine usually lasts for about an hour and then wears off. At that time, your pain will return. Improvement in pain from the cortisone injection usually takes 24 to 48 h. So, expect the pain to return after an hour and hopefully go away in 1 to 2 days.

Rest the Area:

Be careful with the affected area/joint. Usually, the injected medicine causes the area to feel numb. Because you may not feel pain, it is very easy to cause further injury to the area. Do not use the area for anything more than mild essential movements for the next 2 weeks.

Watch for Infection:

Although every precaution has been taken to prevent infection, be alert for the following signs—fever above 100°F, increased warmth in the area, redness at the injection site, redness moving up the arm or leg, and swelling of the area. If *any* of these symptoms develop, call this office immediately at (INSERT PHONE NUMBER).

Follow the Directions of Any Checked Boxes:

- ☐ Apply ice to the area every 4 h for 20 min at a time for _____ day(s)
- ☐ Apply a heating pad to the area every 4 h for 20 min at a time for _____ day(s)
- ☐ Apply an elastic compression wrap to the area for _____ day(s)

- ☐ Perform stretching exercises as instructed
 - ☐ Wear a splint to the area for ____ day(s)
 - ☐ Physical therapy referral
 - ☐ Take the following medicines in addition to your usual medications:
-
-
-

Return to this office in ____ day(s)/week(s) for further evaluation and management of your condition.

Medical Record Documentation

The following template is an example of documentation that may be used for a knee aspiration and injection.

Patient name: _____ Date: _____

Procedure—Knee Aspiration and Injection

Prior to performance of the knee aspiration and injection, a discussion of this procedure and alternative treatments was conducted with the patient. Possible complications were discussed and all questions were answered.

After informed consent was obtained, a point at the intersection of a line in the coronal plane 2 cm above the patella and a line in the frontal plane 1 cm below the patella was identified and marked with the retracted tip of a ball point pen. The lateral aspect of the knee was prepped in a sterile fashion with alcohol and Betadine. Topical vapocoolant spray was used to achieve good local anesthesia. Following the no-touch technique, a 1-1/2 in., 25-gauge needle was inserted and directed medially. 10 mL of 1% lidocaine with epinephrine was used to adequately anesthetize the skin and deep tissues including the periosteum over the anterior aspect of the distal femur. Next, an 18-gauge needle was directed medially into the knee joint capsule and _____ mL of _____ fluid was removed. Finally, a mixture of 8 mL of 1% lidocaine without epinephrine and 1 mL of Kenalog (40 mg) was injected easily into the knee joint using the same 18-gauge needle. The patient tolerated the procedure well without complications and reported complete relief of pain within 5 min.

Signature of medical provider

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